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ELECTROTYPES FROM WOOD ENGRAVINGS.

From the time when the invention for obtaining metallic copies of works of art by galvanic precipitation was first made known, our constant desire has been to lay before the reader a specimen of printing from an electrotype the perfect copy of a wood cut. This wish is now realized. We present herewith an impression from the duplicate of a gem of art, so like the original that if there be any difference between them, it is not perceptible upon the closest scrutiny.

Wood Engraving.

Electrotype Copy.

It is needless to repeat the many reasons why a successful application of this invention to multiplying engravings on wood may be considered the perfection of it, so far as typography is concerned: the advantages that a raised line engraving has over one of an opposite character, in the ease and cheapness with which it may be printed from, it is presumed, are well known. It must suffice, therefore, that much labor and inge-

nuity have been expended to obtain such a result as we now have the satisfaction to announce and exhibit evidence of; but, except in the instance which produced this, with very little success comparatively; that is, the electrotypes, although procured without difficulty by several modes, always lacked much of the sharpness and beauty of the original cut, while that from which the accompanying impression is taken is so close a copy, that even the marks of the grain of the wood may be seen upon it, if it be examined by the help of a magnifying glass.

Of the various experiments upon different plans—such as precipitating upon a stereotype plate, a polytype matrix, or upon the surface of the cut after it has received a metallic or semi-metallic coating, by being rubbed with finely pulverized plumbago or bronze, laid on with a soft brush, or by the decomposition of nitrate of silver through the agency of the vapor of a solution of phosphorus in alcohol, the surface being first washed with an aqueous solution of the nitrate of silver, suffered to dry, and then exposed to the action of the phosphoric vapor; and upon other plans less useful—the nearest approach to the accuracy and certainty that have here been arrived at was by the use of a polytype matrix, which is formed in the following manner:—The face of the wood-cut is suddenly pressed upon the surface of a bath of fusible metal at the moment when the metal, in passing from the melted state, has become just cool enough to retain the impression made upon it. Polytypes are much sharper than ordinary stereotypes, but they cannot be made with safety except from very small cuts, as in any other case the force of the blow required to drive the metal into the lines is very liable to destroy the fine parts of the engraving.

The accompanying impression is from an electrotype obtained by precipitating the copper immediately upon the face of the cut, prepared for receiving it by a coating of plumbago such as we have before described. The back and sides were protected against the formation of the precipitate upon them by a thick covering of wall wax, as engravers technically term it. The connection between the coating on the face and the zinc plate was made by passing one end of the copper wire attached to the latter through the wood from the back, until it became flush

with some part of the engraved surface, and thus in contact with the preparation upon it. The bath was constructed upon the same general principles that we have repeatedly had occasion to describe while recording the progress of the invention, and which, no doubt, are familiar to all who take any interest in the subject.

Much of the knowledge necessary to insure success in an application of the electrotype process to duplicating wood cuts, can only be acquired by experience. Phenomena often unfavorable attend it that are either the effect of accidental influences or of laws not yet understood, from whatever cause they arise, they cannot be guarded against by instruction. A close observation of appearances that present themselves, and a strict attention to uniformity of strength and temperature of the solution, and the positions of the plates with regard to each other, will do more for the experimenter than a volume of directions. To allay any apprehensions that may exist as to the action of the fluid upon the wood, we should remark that from some cause, probably the astringent nature of the cupreous solution, the wood does not swell when immersed in it.

We are indebted to the kindness of J. A. Adams, N. A., for the original engraving and electrotype copy from which these impressions are taken. Mr. Adams has long been engaged upon a set of engravings for a pictorial Bible, and the desire to preserve copies of some of his more labored productions, in case of accident to the originals, induced him almost immediately upon the first publication of the process for copying medals or works of art by galvanic precipitation, to undertake the course of experiments that has resulted in the present successful issue, and gained for him the credit of having produced the *first* perfect electrotype from a wood cut.

In a future number we hope to have the pleasure of presenting a specimen of embossing from an electrotype stamp, copied from the surface of an embossed card. A friend has succeeded fully in getting copies in this manner, and applied them to the business of engraving, in which he is engaged, but the subjects are not such as we can use.

For the American Repertory.

ON RIFLE SHOOTING.

BY ALVAN CLARK.

No rifle can be made to perform without some degree of aberration. I am aware it is thought by many, and by some experienced performers, that a good rifle, loaded and directed correctly, will throw every shot exactly in the same line for a distance of thirty or forty yards; and they ascribe the usual deviation in good shooting to imperfect sighting. But if a shooter will place a piece of white paper, the size of a cent, on a dark gray paper for a ground, at the distance of forty yards, and let the forward sight be shaded so as to appear distinctly darker than the ground, and let the back sight be near the eye, with an orifice about $\frac{1}{30}$ of an inch in diameter, (a construction of sights familiar to all shooters) then place the target so as to receive the full force of the sun's light, and with a good rest, by placing the eye so that the forward sight and target shall appear through the centre of the orifice in the back sight, he may easily satisfy himself that he could hold every time within one-fourth of an inch of the same point.

I have repeatedly, with a well-tuned gun, invited a bystander entirely unpracticed to try five shots, giving him directions to sight every time alike; and the result has been, that both himself and the spectators present have been utterly astonished to find that he could shoot a rifle equal to the most renowned performer. Such things never surprise shooters who are perfectly acquainted with the facts in the case; they know that ranging the sights with an object, and holding them there while firing, is an exceedingly simple operation, and can be performed with little liability of blundering. I have even known it done by ladies with all the perfection imaginable; and if this should chance to meet the eye of one, I hope she will not regard my phraseology as a reflection on female talent and sagacity.

The sights on a rifle should be made to move by a scale; the back sight for the elevation, and the forward for the lateral variation produced by wind, &c. With such a scale properly

made and understood, the shooter may move his sights, and know to a certainty what he has effected. For instance: the sights are just one yard asunder, and the scale graduated by thirtieths of an inch; then by moving one division, he makes a variation in the line of calibre of exactly one inch in 30 yards, two inches in 60 yards, four inches in 120 yards; and in the same ratio for all other distances—that is, one inch in every thirty yards.

Or, if the shooter ascertain how many times the distance between the sights is contained in the distance he is shooting, and divide the distance of his shot from the centre by the same number, it gives him the distance his sight must be moved. This can be ascertained by calculation infinitely better than by experiment.

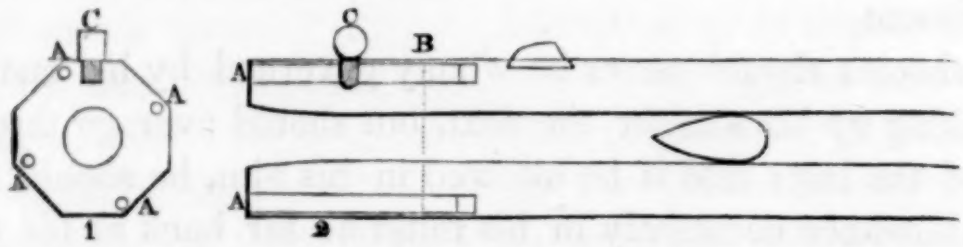
A shooter should never be wholly governed by his last shot in making up his aim for the next, but should average three or four of the last; and if he allowed in his aim, he should keep that allowance constantly in his mind as far back as his three last shots. The best test of the excellence of a gun is, to aim every shot alike for ten or fifteen shots, with the sights so set as to throw them a few inches from the mark, so as not to deface it, and observe with what degree of compactness it will send them.

In order to perform in the art under consideration with the greatest possible accuracy, it is certainly necessary that the sighting should always be good; but that will avail nothing where the gun is fickle: great regularity and steadiness in the delivery of the ball or slug, combined with great velocity, are equally necessary, and vastly more difficult to obtain.

If the rifling in a gun be of such twist and form as to secure the desired effect, I have always found it impossible to load sufficiently snug to prevent all windage, without either disfiguring the lead, or cutting the patch, or both, unless it is done by enlarging the muzzle, which, it is found, can never answer. It is here that a rifle of the common construction first fails. The wear, caused by the patch in entering and the rod in wiping and loading, comes almost wholly on this portion of the gun; and in consequence, it is soon found to be unsteady.

The usual remedy in this case is to cut off about half an inch from the muzzle; and although this increases the difficulty of loading, still it is found to be far better than to allow the lead play as it is about leaving the gun, where the regularity of its movements are most likely to be disturbed by the blast from the exploding powder. And after all, this remedy is but temporary; for by the time two hundred shots have been fired, there will be a perceptible enlargement of the calibre at the muzzle, and a corresponding irregularity in shooting.

To secure the patch from injury, to facilitate loading as tight as can be wished, to obtain and preserve as perfect a delivery as possible, with other advantages, I have fixed upon and patented the following arrangement:



I drill four holes in the muzzle A, and after dressing them out with a suitable instrument to round and straighten them, I cut the barrel off at B; both pieces are then faced at right angles with the calibre; after which I fix steady pins in the piece which is taken off, and which is called the loading muzzle. C is to notify the shooter when sighting, that he may not be in danger of shooting away his muzzle.

This muzzle (Fig. 2) is enlarged at the entrance, as in the engraving, and may in a moment be taken off and replaced at any time. This piece is griped firmly in its place during the operation of boring and rifling, and serves to steady the tools. In using the gun, the operations of wiping and loading are performed through it, in which case it shields from wear that part of the gun which must give direction to the ball. While wiping, the loading muzzle should be held firmly down by the left hand.

I use a fine brown linen patch; and it must readily be seen that in passing through this tapering muzzle, the patch and lead are compressed to fit, and fill the rifling, and get a more fair and uniform bearing than can be obtained in the usual mode of loading. After loading, the muzzle is removed, and in dis-

charging, a very uniform delivery is effected, even when a force in powder is used sufficient to destroy all regularity in a common rifle. Good workmanship is necessary in fitting the steady pins; and as in ordinary straightening by the shade, the eye affords the best test for getting the line of calibre in the two parts to coincide.

For loading slugs, I take a piece of brass a few inches in length, and centre it deeply while running in the lathe with the tool which bores the mould. I then put a wooden centre in the lathe, upon which I turn the brass to the exact size of the calibre of the gun. In loading with this, the axis of the slug is brought parallel to the calibre: this tool would injure a rifle if used without the muzzle. I employ a rifling full one-third deeper than ordinary, and use a lead large enough to half fill it without a patch; whereas, in common cases, leads are made so small that they may be passed bare through the barrel without receiving the least impression from the rifling.

I have been for ten years past thoroughly acquainted with the art of forming the inside of a rifle, and for information have sought the acquaintance of those most distinguished in these matters in regions where I have been; so that when the improvement under consideration suggested itself to my mind, I immediately instituted a series of experiments for the purpose of ascertaining the best model in the gun; the best form, fitting and texture of lead, and the powder, patch, &c. which would work with the greatest regularity.

I should be pleased to give the reader the results of these experiments; but they would occupy too much room. Suffice it to say I was satisfied, when comparing it with what had before been attained, that the sharpshooter could not fail to be gratified with such an acquisition. But being engaged in other pursuits, I was obliged to seek the aid of some manufacturer. I accordingly applied to Edwin Wesson, now of Northborough, Mass. In point of performance, this gentleman's rifles have a reputation of the highest order, and an uncommon elegance in external form and finish. Mr. Wesson has made a number of these guns, the last of which performs better than any one I have ever been able to produce. At one trial of this gun at the

distance of 36 rods, or 198 yards, twenty successive shots were placed within a parallelogram eight inches only in length and five in breadth. This was done with a long and pointed slug, and calibre about 70. I believe this size may be made to work better than a larger up to the distance of 300 yards. I have one target of fifteen shots, made with a gun carrying 104 to the pound, at the distance of 275 yards; the farthest shot is less than ten inches from the centre, and the average of the whole is less than five. This was done with a long slug, and but six feet elevation. In the old-fashioned rifles with large bores, and in shooting balls this distance, seven or eight, and sometimes nine feet elevation is required. Generally, 275 yards require just double the elevation necessary for 200 yards. This rule is modified, however, by the size, form, and speed of the lead. In the various lengths I have tried, I think about three feet the best. For accurate shooting, a rifle should be very strong and heavy, to prevent expansion.

We find these guns work better by giving a slight contraction in the muzzle, commencing about two inches below, and gradually increasing up to the joint, so that when the lead is a little below the joint it passes down with little friction.

In my experiments to ascertain the cause of aberration in rifle shooting, I crooked a barrel about two inches from the muzzle, so as to make an angle of about 20′ or one-third of a degree, and although it would throw one side about six inches in six rods, yet it was nearly as steady as the best gun I can make. I have had the same barrel when well straightened, in the course of a dozen shots, at six rods, scatter over a space of more than two inches, in consequence of a slight enlargement in the muzzle. I should always prefer having a gun perfectly straight; but there may be, I am satisfied, greater defects than crooks.

I would say to those who may be inclined to doubt that this arrangement is an improvement, that, in connection with Mr. Wesson, I am prepared to contend in prize shooting against the most skilful shooters to be found, and the best guns of any construction heretofore in use that can be produced by the art of man. We congratulate ourselves in being able to take this

stand with assurance. Here is no chance for successful quackery; for although the art is based on the most intricate combinations in mechanical science, yet the results to be obtained are definite, and must decide the fate or fortune of this invention.

Some of these rifles will for the present be kept by Messrs. Lane & Read, of Boston, as specimens and for sale; and as soon as convenient agencies can be established, in other cities. I would mention to purchasers that the original cost of one of these guns is but five dollars extra; and at the cost of a shilling it can be converted to a common rifle, without leaving a single trace of its ever having been any thing else.

On loading one of these guns, care should be taken to put on the muzzle before powdering; otherwise the powder is liable to get in the holes, and interfere with the steady-pins; and before laying the gun by after using, it should be well cleaned and oiled.

Boston, March 16th, 1841.

[Reported for the American Repertory.]

Synopsis of a Course of Lectures delivered before the Mechanics' Institute of the City of New-York, during the winter of 1840—41. *By* Joseph L. Chester, *Esq.*

LECTURE I.—NOV. 16, 1840.*

This lecture was introductory to the course, and opened with an intimation that the object of the lecturer was not to lead the minds of his audience on a pilgrimage amid the labyrinths of some intricate science, but to touch their hearts, and call out and enlist that sympathy for a fallen and a ruined race, which is now about all that they can ever receive from us. The simplest light in which we can look upon this once mighty but now powerless people, is the strongest one. Mr. Chester then drew a contrast between the situation and appearance of this country

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* The greater degree of interest that a synopsis of these lectures would possess by being made to include the entire course in connection, has induced us to give here a second report of the introductory lecture, in part supplementary to the former which was published in the Repertory of last December, and which the reader is requested to reperuse, as it contains some extracts that will illustrate a few of the more prominent points of Mr. Chester's discourse.—*Ed. Am. Rep.*

—and to bring the matter nearer home, of *this island*—as it was three and a half centuries ago, and as it is now.

Division of the Lecture.—1. Origin of the N. American Indians. 2. General character and past history.—3. Present condition.

Under the first division, Mr. Chester briefly recounted some of the speculations which have occupied the attention of antiquaries, and noticed some of the strongest arguments in favor of each. The opinion entertained by some, that they are the descendants of the lost tribes of Israel, is supported by some of the traditions and religious ceremonies of the Mandans, and particularly by one which seems to relate to the Flood. The custom among the Charaibes or Caribbees, of *gathering up the knees* preparatory to death, which was noticed by the Spaniards in the 16th century, seems also to favor this opinion.

Mr. Chester then mentioned the pretended discovery of three late European travelers, of a race in the centre of China, corresponding exactly with the Indians of this continent, which race are said to be in possession of manuscripts relating to circumstances three thousand years old; but said that this report must be taken with great allowance, inasmuch as it being the general opinion that the North American Indians did originate from the north of Asia, almost any book tending to substantiate that opinion would be received, even if it were utterly false.

Mr. Chester then showed that it was possible, and now seemed probable, that the researches of the geological surveyors in Ohio would ere long demonstrate that the Indians were the first people who inhabited this country, and that to them we must attribute the erection of the ancient mounds of the West. He also referred to the discovery of the remains of a race, precisely analogous to the Flatheads of the West, in tombs of great antiquity and architectural beauty among the mountains of Peru and Bolivia.

The lecturer concluded this division by saying that we do not *know*, and probably never shall know *positively*, any thing concerning the origin of the race, but expressed his individual opinion that they migrated from the north of Asia, and drove out or destroyed the former inhabitants, whom he believed to have been of Egyptian origin.

Under the second division, Mr. Chester first noticed their

system of government, and their social and international politics. Each tribe was a distinct community—a sovereignty within itself. The fundamental principle of their social polity was complete and absolute *independence*, and among the tribes were carried on all the relations of more civilized communities. He described the manner in which their chiefs acquired their official stations, by deserving merit, and not by political management, and drew an interesting picture of one of their serious councils. He particularly noticed the singular combination of the Five Nations, and applauded the respect paid to the opinions of the females, and the position they held in the councils of the tribes.

He then briefly reviewed those characteristics peculiar to each individual, but so general as to be the characteristics of the whole race :—1st. Their religion.—2d. Their system of education, or, more properly, *rearing*.—3d. Language.—4th. Oratory. 5th. Poetry.—6th. Relative position of the sexes. According to Creuxius, their women performed the combined duties of domestics, peasants, tailors, and oxen.—7th. System of courtship and marriage.—8th. Chastity. On this point they were wonderfully strict, particularly as related to their female prisoners. 9th. Intellectual faculties, particularly those of perception and retention.—10th. Generosity.—11th. Revenge.—Each of these particulars was illustrated by appropriate facts.

Under his third division, Mr. Chester said :—"The past history of this ill-fated people can be told in a few words or extended to volumes. It is all comprised in one short sentence: The Indians were a numerous, powerful, and happy people—possessing, by a natural right, the broad lands of this glorious country: the white man came, saw, and coveted their possessions; commenced and continued to wage a furious and exterminating warfare—and they are gone! Whither? To the graves of their fathers—to the bosom of Manitou—to the heaven of their dreams!"

He then introduced an eulogium on the character and labors of Mr. George Catlin; and, in conclusion, noticed the present condition of the Indians, gave a curious review of the Florida war, and ended with a prophetic denunciation of this nation for the wrongs they have done, and are doing them.

LECTURE II.—DEC. 7, 1840.

This lecture opened with the statement, that "we all know that our government claims and exercises jurisdiction over a large extent of country, but that most of us are contented with simply knowing this fact, without caring to understand the manner in which we obtained our possessions, and that the subject of this discourse is, *The claim of the Government of the U. S. to the land of the Indian.* In order rightly to understand the tenure by which individuals hold minor portions of land under certain governments, and how those governments possess a right to large tracts of country, it is necessary that we go back to the creation, and come down, step by step, to the present time. The object of this review will be to decide whether the claim of our government is either a moral or a legal claim, or both, or neither."

Mr. C. then traced the history of the right of property from the time of Adam down to the period when it was settled that an exclusive property in the *soil* might be acquired and maintained, making four distinct eras:—1st. The time when our first parents might have been said to be the absolute owners of the whole earth, or when, in his own striking words, "Adam might have stretched his arm over the broad expanse of sea and land, and said, as his eye rested on hill and dale, on lake and mountain brook, on flowery bank and woodland scenery, *These all are mine!* When we reflect on the value attached at the present day to the possession of a few feet of ground, is not the idea an overwhelming one that there was a time when this whole world was the exclusive property of *one* man, who received his title-deed direct from the hand of the Almighty!"—2. The time when, after the increase of population, it became necessary that some distinct and settled notions concerning the right of property should be recognized and adopted, and when it was tacitly agreed that a man's property should consist in the *use*, though not in the substance, of a thing.—3. The time when it was settled that one might acquire a property even in the *substance* of all movables, in flocks and herds, and in the article of water, or in wells.—4. The time when it was settled

that one might acquire a property even in lands. But it was necessary that one should cultivate the soil which he claimed, else his claim was worthless. This decision, of course, brought with it all the forms and customs of society, states and governments, laws, punishments, &c. At the same time the right of migration was recognized, but with the restriction that emigrants should not settle on preöccupied lands.

Mr. C. then referred to the manner of acquiring titles to land at the present day. There are but two primary and legitimate ways, viz. by occupancy, and by conquest. By the latter method we acquired the possession of this country. In announcing his intention to prove that we had no title to our possessions, he quoted a passage from Vattel, book 1, chap. vii, p. 94, sec. 81. In the examination of the passage, he drew a parallel between the lands of the Indian, and those of Lord Moneypurse, in Great Britain, who keeps thousands of acres for a deer-park or hunting forest, and showed:—1st. That the Pilgrims had as much right to usurp *his* lands as those of the Indians; 2d. That the North American Indians *did* cultivate the soil just as much as was necessary for their subsistence, and therefore by the natural law had a valid title to their possessions; 3d. That the Indians were willing that the whites should take and enjoy a portion of their territory, but that the whites had no right, either legal or moral, to take the whole. Under this head Mr. C. showed that the United States and territories embrace at least one billion of acres; that according to the last census the ratio of cultivation is about 10 to 22, making about 455,000,000 of acres under cultivation, and leaving about 545,000,000 still uncultivated, and now as well fitted for the residence of the Indian race as ever. He concluded this division by recapitulation: that our claim is not a *moral* one, inasmuch as it is contrary to the spirit of the law of nature; and that it is not a *legal* one, for that it is directly opposed to the voluntary law of nations, as that law is stated and explained by the very commentator on whom the supporters of this claim the most confidently rely. Mr. C. then said as follows:—

> And now the question may be asked, What has all this to do with *us?* Are *we* accountable for the injustice done to the Indians by our

fathers before we were born? Not exactly: but we *are* accountable for completing the work of destruction which they commenced; and we shall find, when we stand before that deep-searching and impartial tribunal, where the red man will have equal justice with the white, that not the least nor lowest count in our indictment will be written with the blood of some forest king, who has gone up from his people with a complaint that the Judge of all the earth can not and will not overlook.

I need not go back, for an instance which brings the matter home to us, to the days of the Pilgrims, nor to the last century; no, nor ten, nor two years back; no, nor one month, nor one day, nor one hour. Transport yourselves by one effort of the mind to the dismal swamps of Florida. What see you? A small number of feeble, miserable beings, the only remnant of a once powerful and flourishing tribe. You fix your eye upon one poor wretch, leaping and plunging for his life through the briers and over the bogs of a half-filled marsh! For his life, I say, for close behind him come tearing on a band of greedy and furious bloodhounds, while at every point at which he can clear the swamp stands an army hireling, with musket pointed and bayonet fixed. The human game, hunted till ready to drop with fatigue, and seeing that escape is impossible, falters; then starts with horror at the sight of his savage pursuers, then droops again, and throwing a glance of mingled reproach and beseeching pity on the soldier nearest him, bares his brawny bosom, and receives the ball, or, still worse, feels the horrible fangs of the Cuba bloodhound in his shrinking flesh! Hark! hear ye not the shout that rends the air? Does not your heart leap proudly in your bosom at this new trophy of victorious battle, this new addition to the measure of your country's glory? But look yet longer: the dead, or, perchance, living captive, is borne to the conqueror's camp, and there received with unbounded joy. A blow has been struck at the very foundation of the enemy's citadel, and the triumph is overwhelming. Amidst the rejoicings of the camp, and the public demonstrations of gratified pride, the gallant colonel prepares his dispatches for the government. An express is instantly sent to the Department of War, with the glorious and cheering intelligence that Tigertail or Wildcat is taken, with a *slight* loss of some twenty privates and two or three officers,—with a postscript, for the private eye of the Secretary of War, affording him the agreeable information that his four-footed soldiers have acquitted themselves in such a manner as to redound greatly to his *honor!*

Mr. C. then reviewed at some length the causes of this war; showed what might be done to ameliorate the condition of the remaining tribes; urged the establishment of a national gallery, as proposed by Mr. Catlin; and entreated his audience to keep alive in their own breasts, and strive to create in those of their children, that sympathy which will prevent the Indians from sinking into total oblivion.

LECTURE III.—DEC. 14, 1840.

The subject of this lecture was "*The moral and intellectual character of the North American Indians*," and was treated under the following five divisions:—

1. Their *moral* character previous to the settlement of this country by the whites. We are able to know what this was, because they preserved that character until some time after that event. Their highest order of morality, or their system of religion, was just that one which we can reasonably believe to be the perfection of all human systems where the mind has not been enlightened by the use and understanding of the holy scriptures. While the heathen and the infidel worship gods which are the creations of their own minds, the Indian found for himself a God whose attributes, in the abstract, closely resembled those of Him we worship. The crudity of their religious ideas was more than counterbalanced by the universality of their creed. There was not a solitary skeptic among them all. A strong contrast may be drawn between their religion and ours: theirs was universal; ours is partial: without light they believed; with the greatest light many of us pretend to disbelieve. The North American Indians understood all the elementary principles of the religion of the Bible, and practiced them too. They abstained from the commission of those acts openly wrong. Adultery, lying, theft, and actual murder were unknown among them. They provided for their families, and were good parents. Their children were taught to reverence old age. They were orderly in all their intercourse with each other, and with other tribes. They possessed all those qualities which go to make up the character of one who is now called a *moral* man. They were kind, generous, trustworthy, confiding, and strong in their attachments. "In short, they were morally constant, and constantly moral; and many more might have been taken from the forests who could compete successfully with the old Roman heroes in the practice of the cardinal virtues, than could now be found throughout the civilized portion of these free and enlightened States."

2. Their *intellectual* character previous to the settlement of the

country by the whites. We have, in the primitive Indians, an example where the physical, moral, and intellectual characters were precisely of the same order, and where one was directly dependent on the other. The intellectual character of the true Indian is moulded by his physical, while his moral is the polisher which smooths its asperities. For this reason, those faculties of his mind which were the most strongly developed were entirely dependent upon his course and habits of life. Of these faculties, *perception* and *retention* were the most remarkable. Mr. C. here related astonishing instances of the exercise of these faculties. He then referred more at length to their system of government and international polity, and to their language, oratory, poetry, &c.

Though the North American Indians did not *exhibit* any of the *highest* orders of intellect, yet there can be no doubt that they were in their brain, and that they were capable of cultivation. "The existing generation could not of course have been induced to give up their beloved mode of life, and march at once, and without regret, into the boundless plain of mental cultivation; but had the proper course been established and pursued, there can be no doubt that the Indians within our borders and under our jurisdiction would at this day have been desirable allies and brethren, and would now have conduced greatly to the glory of our arms, our legislation, and our literature."

3. The *moral*, and—4. The *intellectual* character of the North American Indians *now*. Though a small portion have become partially civilized, yet the great majority have sunk to the lowest depths of vice and brutality. Their former character is now totally reversed. Even the faculties of perception and retention, which were the most brilliant, can now hardly be recognized. Their former beautiful, because simple and natural, system of government and international polity is leveled to the dust, and they give themselves no concern about the relations of communities, save when called upon to execute some covenant with the government, the language and purport of which they do not, and do not care to understand. Their peculiar idiom is lost. The pure and abstract elements of poetry are no longer to be found in the conceptions and notions of the remaining tribes.

They do not now have a spirit or genius as the cause of every natural effect, nor do they now personify every moral influence. They no longer worship the creative power of intellect, or invoke the faculty of pure imagination. Poetry and prophecy are no longer identified by them, and the almost exhaustless mine of metaphor and simile once open in their fancies and habits, is about to be closed for ever.

5. The *cause* of the present degradation, both in morals and intellect, of the existing remnant of the Indian race. It is truly mournful to reflect that as this prosperous and glorious republic is approximating to complete perfection, that numerous and noble race, who were once the absolute owners of all our possessions, are wasting away with the rapidity of a snow-wreath in summer. One cause of their present degradation is the war of extermination which has been waged against them ever since the Pilgrims first set foot upon these shores. But this is not the only cause, nor the greatest one. The means employed have been moral—or rather *immoral* means. It is the vices which the white man has introduced among them. The introduction of ardent spirits brought all the other vices in its train; and the introduction of the arts and simple sciences, and their results, while it relieved them from their dependence on natural developments and signs, furnished them with no desires of improvement, and thus struck a deadly blow at their intellectual nature.

This lecture concluded with a review of what we had lost as a nation by the destruction of the Indians, and what we might have gained by their preservation—in arms, in legislation, and in literature.

LECTURE IV.—APRIL 8, 1841.

On the application of Indian history and character to American Literature.—This lecture opened with a review of the foundations on which the domestic literature of various nations is erected, and by the assertion that, as a nation, we have nothing that can be called a national literature. Now this is an undisputed fact. The writers of our lighter literature travel over the whole surface of the globe in order to find the characters for their works,

while they overlook those far nobler ones which they might find at home. What Mr. Chester particularly insisted upon was, that the history and character of the North American Indians should be made the foundation of a system of literature that should be purely American. He showed that, however simple this idea seemed, it was one of incalculable weight. The history and character of the North American Indians contains or embodies every qualification necessary for the basis of such a system. In support of this proposition, Mr. C. referred to the works of Sir Walter Scott. What gives them such merited celebrity? The very simple fact that they are true and faithful delineations of the character and history of the Scottish race. And for the same reason, these works will live as long as the world lasts. But how different the fate of those ephemeral productions which are born and die the same day! and simply because their characters are but the creations of the mind. Mr. Cooper is the most prominent American author who has laid the scenes of his works in the forests, and chosen his characters from the red men who inhabited them, and there can be no doubt that his earlier productions will yet last many centuries.

Mr. Chester showed the necessity of our doing this work because it can be done by no others. Who can entertain any conception of the loss which we have sustained, on account of the destruction of the Indians, in such a system of literature? Who can entertain the slightest conception of the immense gain which would accrue thereto, could even one historian, one biographer, one poet, and one novelist, step forth from the ranks of the few that remain, and present us faithful transcripts of forest life, in their own peculiar styles? Had their natural powers of mind been cultivated, they might now have occupied positions of the highest eminence in the legislative hall, at the bar, and in the pulpit. Their wild and vigorous intellect might ere this have plunged deep into the fathomless ocean of metaphysical and moral learning, and struck out and prepared new paths for the intellectual advancement of the world. As an acquisition to the domestic literature of our country, we can entertain no conceptions of their value. Their history and character would have furnished the most fruitful and exhaustless

fields for the native poet and novelist, and their own writings, might have been as renowned in future ages as are now the old Greek and Roman classics. But alas! the possibility of this exists no longer. Other hands must write their history and portray their character. Other pens must bid them live in song and story; and unless these pens be ours, it is much to be feared that the day will come when what we now know and see of the Indians, if repeated to those then living, will be pronounced the ravings of insanity or the visionary dreamings of romance. It is only by our making Indian history and character the basis of our lighter literature, that will preserve them from utter oblivion.

Mr. C. insisted at some length upon this proposition, and established its practicability by numerous facts and illustrations; and it is to be hoped that the time will yet come, before the last of that ill-fated race shall have gone to the graves of his fathers, when this nation will not only establish a national gallery in order to preserve their looks, manners and customs, but also record their virtues and all the qualities of their national character on pages which shall bear them safely down the stream of time, and make them live when their bones have all mouldered into dust.

[For the American Repertory.]

ON THE EFFECTS OF ARTS, TRADES, AND PROFESSIONS, AS WELL AS HABITS OF LIVING, ON HEALTH AND LONGEVITY.

No. IX.

We have already adverted to various employments, such as engraving, tailoring, shoemaking, &c. in which an unnatural or constrained position exerts a pernicious influence upon health. There are numerous occupations in which a similar posture combines, with other circumstances, to abridge the term of human life; such as weaving, saddle and harness making, currying and leather dressing, besides many other handicraft trades which are necessarily pursued in a bent position of the body. Headache and indigestion are the usual attendants upon these

occupations, and debility and languor of the circulation are hardly less common.

Since the extensive introduction of machinery, hand weaving has gone almost into disuse, except in some of our cities, where large numbers of foreigners, chiefly Scotch and Irish, are employed in manufacturing the cheaper kind of cotton goods. These form, perhaps, without exception, the most miserable class of our working population. Though employed often 16 hours out of the 24, they seldom make more than four shillings a day, on which they have to support themselves and families. They work in a damp, confined atmosphere, usually in basements or cellars, where no attention is paid to ventilation or cleanliness. Here with the trunk fixed, the chest unexpanded, though the limbs are fully exercised, they consume their lives in unceasing toil, with scarcely any more cultivation of their moral and rational faculties than is manifested in the brute creation. To these causes, together with an innutritious diet and the free use of alcoholic stimulants and tobacco, is it owing that the longevity of weavers is less than that of almost any other class of operatives.

It has been observed that occupations which require *long continued standing*, are apt to produce *varices* in the lower extremities, as in butchers and printers. It is no less true that undue pressure upon any particular part of the body, in the exercise of any art or trade, or even slight pressure, when long continued, is highly injurious; and in no instance is this more remarkable than where pressure is made upon the abdomen, particularly over the epigastric region, so as to impede the action of the respiratory muscles. There are many occupations which, as now pursued, are extremely detrimental to health, that might be prosecuted with complete impunity, if attention were paid to these circumstances. Thus, the pernicious practice of leaning against a table in writing, has been very generally exchanged for a standing position at a desk; but this ought to be alternated with a sitting posture, taking care not to press the chest against the desk. Cerebral and nervous affections are usually caused by the stooping position; hence their frequency in gardeners. Dr. Copland remarks, that working in constrained positions

shows its effects most decidedly in *miners* and *colliers*, who labor chiefly in the sitting or kneeling posture, frequently with the body bent in the greatest degree, in an unnatural atmosphere, often containing hydrogen or carburetted hydrogen and carbonic acid gases, and with artificial light. They are, moreover, exposed to changes of air, and occasionally work with their feet in water. They are generally spare men, with slightly curved spine and bowed legs. Their complexion is unhealthy. Their complaints are asthma, rheumatism, disorders of the head, intolerance of light, &c. evidently resulting from the circumstances just stated connected with their employment, and their exclusion from the beneficial influence of sunshine, light, and air. Mr. Lanyon gives the following table of the average ages of 1101 miners, working under ground, in seven mines, in Cornwall, England, in 1837:—

Mines.	No. of Men in each.	Average age.	Average time of working under ground.
1	118	30 yrs. 5 mos.	14 yrs. 10 mos.
2	200	30 yrs. 3 mos.	14 yrs. 10 mos.
3	240	31 yrs. 7 mos.	16 yrs. 10 mos.
4	112	31 yrs. 3 mos.	16 yrs. 3 mos.
5	253	30 yrs. 6 mos.	15 yrs. 4 mos.
6	50	30 yrs. 1 mo.	15 yrs. 11 mos.
7	128	32 yrs. 6 mos.	19 yrs. 6 mos.

The aggregate of the years of all these miners amounted to 34,152, which gives 31 years for each individual; and the number of years in which they have been engaged under ground is 17,812, furnishing an average of 16 years 2 months for each. Of the total number, there were

532 of 30 and less than 40 years.
263 " 40 " " " 45 "
157 " 45 " " " 50 "
78 " 50 " " " 55 "
39 " 55 " " " 60 "
14 " 60 " " " 70 "
1 " 70 and above.

Of 174 persons, in the same district of country, who pursued agricultural labor exclusively, the average age was 47 years,

32 of which they had spent in their respective occupations. Out of 270 miners whom Mr. Lanyon personally examined, without selection, all of whom had worked at least ten years under ground, 85 persons had cough, dyspnœa, or palpitation, (72 of these being 30 years of age or above, and only 13 below) 70 were subject to dyspepsia, 28 to chronic rheumatism, and 31 to other affections; 32 of the 270 had had hemoptysis.* These statements may serve to show the comparative healthiness of agricultural and mining occupations.

Temperature and Moisture.—With proper precautions, the human body may be exposed with impunity to great changes of temperature. In our own climate, these changes sometimes amount to 40° in 24 hours. Sir Charles Blagden remained eight minutes in an apartment heated to 260°, and Tillet and Duhamel bore a heat of 290° for nearly five minutes, without suffering any great inconvenience. The natural temperature of man is about 98°; and this remains so constant, equable and perpetual, that it varies but a few degrees in the coldest climate and under the torrid zone. It was the opinion of Boerhaave that man could not live in a temperature exceeding his own; but this is now known to be incorrect, since many inhabited parts of the torrid zone have a temperature of from 100 to 130°. This faculty of bearing a variety of temperatures is a peculiar prerogative of man, and enables him to inhabit every part of the earth—from the polar circle, where mercury freezes, to the equator, comprising a range of 185°. The impunity with which man is able to bear violent changes of temperature is strikingly manifested in the case of the Russian, who leaves his vapor bath of 167°, and plunges into a bank of snow or a frozen river, or perhaps has several large vessels of cold water poured upon him. In all these cases, the animal heat remains nearly the same; so that the human body has the power of generating heat, when surrounded by a temperature below its own, and of producing cold, or at least of consuming the heat, when exposed to a temperature above the natural standard. In all temperate climates, the body is constantly parting with caloric, and the

* Geological Report on Cornwall, p. 570.

object of clothing is to prevent its escape; while within the tropics, or where the heat exceeds that of the body, the true policy is to exclude the heat. Milne Edwards states, that if, from any cause, the organs of calorification should become deranged, so that external heat, greater than that of the body, could produce its ordinary effects by conduction or radiation, or both, as in inanimate objects, so as to raise the temperature 12 or 14 degrees, the individual would die; while on the other hand, the temperature of the body may be reduced by exposure to excessive cold to 79° before death would ensue.

It is a fact, however, universally acknowledged, that great vicissitudes of temperature are extremely productive of disease among artisans: though this is doubtless chiefly to be attributed to great negligence and want of caution in exposure to them. Bakers, forgers, brass and iron founders, glass blowers, brewers, gas makers, and various other classes of artisans, suffer from the high temperature in which they work, and by imprudent exposure to cold when perspiring. The consequences are checked perspiration, producing catarrhs, rheumatism, asthma, bronchitis, inflammation of the lungs or some of the other important viscera.

The skin it is well known, produces chemical changes similar to those which occur in the lungs; and like them, forms a watery secretion and excretes foreign matters, besides being an organ of absorption. The mean pulmonary discharge in 24 hours amounts, according to Lavoisier and Seguin, to 15 oz., and the cutaneous to 30 oz. But this is an under estimate. The mean losses by perspiration in a day, at the ordinary external temperature in which the body is placed, are thus stated by the experimenters:—

	Robinson—42 yrs.	Robinson—64.5 yrs.	Keill—39 yrs.	Rye—42 yrs.	Lining—40 yrs
By observation,	45 oz.	27 oz.	30 oz.	56 oz.	60 oz.
By calculation,	41 oz.	27 oz.	35 oz.	46 oz.	62 oz.

In artisans, however, who carry on their work in elevated temperatures, the quantity is vastly increased. The excessive external heat is employed in converting the water which is poured out upon the skin into vapor, thus generating cold upon

the very surface where, under ordinary circumstances, a large portion of the animal heat is produced.*

In order to ascertain with precision the amount of fluid lost by workmen exposed to a high temperature, Dr. Southwood Smith made the following experiments, at the Phœnix Gas Works, Bankside, London, in Nov. 1836.

EXPERIMENT I.

Eight of the workmen regularly employed at this establishment in drawing and charging the retorts and in making up the fires, which labor they perform twice every day, commonly for the space of one hour, were accurately weighed in their clothes immediately before they began and after they had finished their work. On this occasion they continued at their work exactly three-quarters of an hour. In the interval between the first and second weighing, the men were allowed to partake of no solid or liquid, nor to part with either. The day was bright and clear, with much wind. The men worked in the open air, the temperature of which was 60°, Fahrenheit. The barometer 29° 25′ to 29° 4′.

	Weight of the men before they began work.				Weight after finishing work.				Loss.	
	cwt.	qr.	lbs.	oz.	cwt.	qr.	lbs.	oz.	lbs.	oz
Michael Griffiths	1	1	14	10	1	1	12	2	2	8
John Kenny	1	0	26	10	1	0	24	1	2	9
John Ives	1	0	14	2	1	0	11	8	2	10
James Finnigan	1	1	10	6	1	1	7	0	3	6
William Hummerson	1	0	24	4	1	0	20	8	3	12
Timothy Frawley	1	1	8	10	1	1	4	12	3	14
Patrick Nearey	1	1	14	10	1	1	10	8	4	2
Bryan Glynon	1	1	0	4	1	0	24	1	4	3

* It is well known that fevers, dysentery, and hepatitis, with a great variety of bowel complaints, are caused by the excessive heat of tropical climates, and are closely connected with the condition of the skin. To prove that hepatic disease may be induced by heat alone, it is sufficient to refer to the celebrated *Pates de foies gras*, prepared at Strasburg and Metz, which are the diseased liver of the goose artificially enlarged by means of heat. "They are crammed," says Dr. Dunglison, "with food, kept from drink, nailed to a plank by the webs of their feet, and placed quite close to the fire, and in due time the liver becomes greatly enlarged, owing perhaps to the excessive elevation of temperature diminishing the nervous energy," thus interrupting the digestive process, and leading to engorgement of the liver. Southwood Smith, however, accounts for the increased action of the liver from heat, to the fact that caloric induces an increased quantity of carbon in the blood, and as the hydrogen is chiefly removed by the increased perspiration, thus preventing the formation of fat, which is a compound of hydrogen and carbon; consequently, as the lungs cannot carry off the superabundant portion of carbon, nor the adipose tissue compensate for its diminished activity by the deposition of fat, the liver takes on increased action, and secretes an extraordinary quantity of bile. But this increased functional activity of the hepatic apparatus sooner or later terminates in actual disease.

EXPERIMENT II.

Day foggy, with scarcely any wind. Temperature of the air 39° Fahr., barometer 29° 8′. On this occasion the men continued at their labor one hour and a quarter.

	Before.				After.				Loss.	
	cwt.	qr.	lbs.	oz.	cwt.	qr.	lbs.	oz.	lbs.	oz
Patrick Murphy	1	1	0	0	1	0	27	2	0	14
John Broderick	1	0	9	4	1	0	8	0	1	4
Michael Macarthy	1	0	11	9	1	0	10	3	1	6
Michael Griffiths	1	1	15	8	1	1	13	2	2	6
James Finnigan	1	1	12	4	1	1	9	12	2	8
Bryan Duffy	1	1	11	12	1	1	9	0	2	12
John Didderick	1	1	11	5	1	1	8	8	2	13
Charles Cahell	1	1	4	5	1	1	1	6	2	15

Charles Cahell, the man who on this occasion lost the most, was weighed previously to the commencement of his work, with all his clothes off, excepting his shirt, which was kept dry and put on him again when weighed a second time at the end of his work. He was then immediately put into a warm bath at 95° Fahr. and kept there half an hour; he complained of being weak and faint, and when reweighed had gained half a pound.

EXPERIMENT III.

Day clear, with some wind. Temperature 60° 5′.

	Before.				After.				Loss.	
	cwt.	qr.	lbs.	oz.	cwt.	qr.	lbs.	oz.	lbs.	oz
Robert Bowers	1	1	19	0	1	1	17	0	2	0
William Mullins	1	1	3	0	1	1	1	0	2	0
Charles Cahell	1	1	2	0	1	1	0	0	2	0
John Kenny	1	0	22	2	1	0	19	8	2	10
Bryan Glynon	1	0	27	0	1	0	24	4	2	12
John Haley	1	1	4	0	1	1	1	4	2	12
Benjamin Faulkner	1	1	5	14	1	1	13	0	2	14
Michael Griffiths	1	1	18	8	1	1	5	8	3	0
John Broderick	1	0	4	6	0	3	27	8	4	4
John Didderick	1	1	6	12	1	1	1	10	5	12

The two last men worked in a very hot place for one hour and ten minutes; all the rest worked about one hour. Michael Griffiths, as soon as he had finished his work, was put into a bath at 98°, where he remained half an hour. He was reweighed on coming out of the bath, and had lost 8 oz.

From these observations it appears, that towards the end of November, when the temperature of the external air was 39°, and the day was foggy and without wind, the greatest loss did not amount to 3 lbs. (2 lbs. 15 oz.) the least loss was 14 oz. and the average loss was 2 lbs. 3 oz.

In the middle of the same month, when the temperature of the air was 60°, and the day was clear with much wind, the greatest loss was 4 lbs. 3 oz., the least loss was 2 lbs. 8 oz., and the average loss was 3 lbs. 6 oz.

In June, when the temperature of the external air was 60°, and the

day exceedingly bright and clear, without much wind, the greatest loss was 5 lbs. 2 oz., the next greatest loss was 4 lbs. 14 oz., the least loss was 2 lbs., and the average loss was 2 lbs. 8 oz.

The same individuals lose very different quantities at different times. Thus, James Finnigan in the first experiment lost 3 lbs. 6 oz., in the second 2 lbs. 8 oz. Michael Griffiths in the first experiment lost 2 lbs. 8 oz., in the second 2 lbs. 6 oz., and in the third 3 lbs.; while John Kenny in the first experiment lost 2 lbs. 9 oz., and in the third experiment, which was the second to which he was subjected, he lost very nearly the same, namely, 2 lbs. 10 oz. On the other hand, Bryan Glynon in the first experiment lost 4 lbs. 3 oz., and in the third experiment, which was the second to which he was subjected, he lost no more than 2 lbs. 12 oz.

In one case, when a man who had lost 2 lbs. 15 oz., the greatest quantity lost by any of the men examined during that day, was put into a hot bath at 95°, and reweighed on coming out of the bath, where he had remained exactly half an hour, it was found that he had gained half a pound. On the other hand, when a man who had lost 3 lbs. was put into a hot bath at 98°, and kept there for half an hour and reweighed, it was found that he had lost exactly half a pound.

The results of these observations are as interesting in relation to absorption as to transpiration. Thus, James Finnigan, on the 18th of November, weighed,

	cwt.	qr.	lbs.	oz.
Before the experiment	1	1	10	6
After the experiment	1	1	7	0
Having lost	0	0	3	6

On the 25th of November he weighed 1 cwt. 1 qr. 12 lbs. 4 oz., having gained in the interval 1 lb. 14 oz.

Michael Griffiths, on the 18th of November,

	cwt.	qr.	lbs.	oz.
Before the experiment, weighed	1	1	14	10
After the experiment	1	1	12	2
Having lost	0	0	2	8

On the 25th of November, before the experiment, he weighed 1 cwt. 1 qr. 15 lbs. 8 oz., having gained 14 oz.; but on the 3d of June he weighed 1 cwt. 1 qr. 8 lbs. 8 oz., having lost between the 18th of November and the 3d of June 6 lbs. 2 oz.

John Kenny, on the 18th of November,

	cwt.	qr.	lbs	oz.
Before the experiment, weighed	1	0	26	10
After the experiment	1	0	24	1
Having lost	0	0	2	9

On June the 3d he weighed 1 cwt. 22 lbs. 2 oz., having gained in the interval 4 lbs. 8 oz.

Bryan Glynon, November 18th,

	cwt	qr.	lbs.	oz.
Before the experiment, weighed	1	1	0	4
After the experiment	1	0	24	3
Having lost	0	0	4	1

On the 3d of June he weighed 1 cwt. 27 lbs., having lost 1 lb. 4 oz.

Thus, in the course of their ordinary occupations, these men are in

the habit of losing from 2 lbs. to 5 lbs. and upwards, twice a day; yet, when weighed at distant intervals, it is found that some have actually gained in weight, and others have lost only a few pounds; it follows that the activity of the daily absorption must be proportionate to that of the daily transpiration.

These experiments serve to show the extreme activity of the assimilating and depurating processes, as well as the mode in which the body is preserved from injury when exposed to heat, which, without perspiration, would speedily prove fatal. If the ingesta in 24 hours be 6 lbs. or 96 oz., and 4 oz. of oxygen be retained in the system, in all 100 oz., it is estimated that the egesta will be, in 24 hours, by the skin 34 oz., by the lungs 17 oz., by the intestines 6 oz., by the kidneys 40 oz., and by various other excretions 3 oz.—in all, 100 oz. Thus various morbid and effete matters are constantly removed from the system, which, if retained, would speedily cause disease and death. The lungs excrete a large portion of carbon and some hydrogen; the liver, a large portion of hydrogen and some carbon; the kidneys, a large portion of azote; the skin, a large portion of hydrogen and some carbon; the intestines, the residue of the aliment; while by the deposition of fat the superabundant carbon and hydrogen is withdrawn from the circulation, and laid up in store in certain parts of the body. We thus perceive how it is that jockeys reduce their weight by profuse sweats, and why artisans who work in a heated atmosphere never become fat, the hydrogen necessary for the formation of this substance being thrown off by perspiration.

After investigating this subject very thoroughly, and under the most favorable circumstances for correct observation, Mr. Thackrah was led to adopt the following inferences:—

1. That operatives habituated to a high temperature daily feel effects similar to those felt by persons who occasionally place themselves in this temperature. Habit seems to have little power in rendering the body insensible to heat. The men daily have an excitement of pulse, perspiration proportionate to the degree and continuance of the heat, and its complication with muscular labor, thirst, and languor. The complexion is rendered pale, and the digestive functions are impaired. In all, the tongue is white.

2. Persons exposed by their labor to great and frequent variations of temperature, are not more subject to inflammation of the lungs, or of the bronchial membrane, to pleurisy, or fever, than other men.* Even the founders and dry-house men, who, many times a day, make sudden transitions of temperature, often equaling 100° or 120°, are neither sensible of inconvenience at the time, nor subject to pulmonic disorders.

3. Affections termed rheumatic are frequent in this class. Thackrah inquires, whether, if the *exciting* cause of such complaints be referred to great and sudden changes of temperature, the *predisposing* cause may not be attributed to the unhealthy state of the abdominal viscera, induced by the excessive use of fermented liquor?

4. Though the digestive functions are impaired, and the muscular power reduced, organic disease does not speedily result. Men working in high temperature are not often incapacitated for work.

5. Adults bear heat better than the young.

6. Most of these occupations require a very nutritious diet—much more so, indeed, than that of husbandmen.

7. Life is not shortened materially by exposure to great heat. Though operatives of this class do not live as long as agriculturists, yet they are not shorter lived than the bulk of townmen.

The same writer very judiciously recommends, in the way of remedying the above evils:—1. To diminish the muscular labor which is performed in hot rooms.—2. To drink lemonade and other mild diluents, instead of malt liquors.—3. To use stimulants with food after labor, if used at all.—4. To reduce the *period* of labor. According to our observation, which has been confined chiefly to forgers, gas makers, and glass workers, alcoholic stimulants are far more pernicious to those exposed to high temperatures than when employed by other classes of operatives. But in either case they are a more prolific cause of disease than all others united, and tend more effectually to diminish longevity than anything peculiar to the trades and occupations themselves.

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* This does not coincide with our own experience.

The bad effects of *moisture* only, Dr. Copland thinks are problematical, or at least not very remarkable; and that it is only from the circumstance of its being either the cause of a greatly depressed temperature, or the very common vehicle in which other agents of disease are dissolved and thereby diffused in the air or applied in a more active state to the different organs, particularly the respiratory, that it becomes a very active agent of disease. "When exposure of the external surface of the body to moisture is injurious," he remarks, "the mischief is caused chiefly by the depressing effects of the low temperature which it occasions. The animal heat is less rapidly carried off by entire submersion in water than by aspersion merely. In the former case there is no evaporation; in the latter, more or less evaporation takes place, and much cold is thereby generated. The histories of shipwrecks abound in proofs of this position. It is owing to the evaporation which takes place from damp or moist clothes, and the consequent rapid reduction of their temperature, that disease is occasioned by them. Artisans who, from the laborious nature of their occupations, perspire copiously, and thereby render their clothes damp, seldom suffer from this cause while they continue their labors; but when they relax or desist altogether, their wearing the moistened clothes, particularly in a state of exhaustion, is frequently productive of disease. Inattention to, or inability of changing damp or wet clothes, are the most common causes of the disorders met with in milkmen, gardeners, fishermen, washerwomen, water carriers, fullers, and persons whose occupations are chiefly out of doors. In marshy or unhealthy localities the effects of this cause are greatly increased. The steepers and cleaners of hemp and flax are extremely liable to intermittents, owing to the conjunction of vegetable effluvia with moisture. Even persons constantly employed in crowded factories, where the stagnant air becomes loaded with the foul vapors exhaled from the lungs of a number of persons, may have their clothes so saturated with moisture as thereby to occasion the usual consequences of cold, when exposed to a drier or purer air. It should be kept in recollection that cold, when it continues to act for any time upon the frame, is sedative—it depresses the vital influence; and when

acting partially, or directed to parts of the body only, that it is one of the most productive causes of altered energy and sensibility of the nervous system of such part, of irregular distributions of vital influence and of the blood, and, consequently, fruitful of inflammations, and of morbid discharges and actions."

Mr. Thackrah thinks that the agency of moisture on men in the open air, or those under cover, is much less than common opinion would expect. In this opinion, however, we cannot agree. It is true that many of the diseases attributed to "taking cold," are the result of other causes, and that effects are often attributed to suppression of perspiration which principally result from the action of cold upon the system. Indeed, it is very doubtful whether the insensible perspiration can be entirely checked; and sometimes it is supposed to be suppressed when it is actually increased. But no one, it would seem, can doubt the pernicious effects of the application of cold, damp air to the body, as it rapidly conducts the heat from the surface, and often sends a sudden chill through the system, especially where the constitution is feeble. Thus, among hatters, paper makers, dyers, distillers, &c. who are exposed to great atmospheric changes both of humidity and temperature, rheumatisms and pulmonary affections are common, and the exciting cause is universally acknowledged.

AMERICAN INSTITUTE.

REPORT OF THE COMMITTEE ON MANUFACTURES ON STOPCOCKS.

The following Report from the American Institute has grown out of an application to the Institute, from Samuel Stevens, Esq. President of the Board of Water Commissioners, stating that difference of opinion had existed between the Corporation and the Board of Water Commissioners as to the kind of stopcocks which are being used by the Corporation. The Report has been made by gentlemen of great science and practical information, and gives the preference to the plan used by the Water Commissioners over the one used by the Corporation, but has also suggested an improvement on the one used by the Commissioners. The views of the Water Commissioners, also, as

respects the description of iron castings, whether from the ore, or remelted iron, appear to be confirmed by the opinions of the Institute.

The Committee on Manufactures of the American Institute—to which was referred a communication of the Board of Water Commissioners, requesting an examination of the two kinds of stopcocks used respectively by the Commissioners, and the Aqueduct Committee of the Corporation for the distributing water pipes, and an expression of their opinion as to which of them is most to be relied on—respectfully Report:—

That they have given this inquiry every attention in their power, and in order to render the deliberations and investigations of this Committee more satisfactory to the public and to the parties at whose request they were undertaken, invitations were sent to several individuals, distinguished for scientific and practical attainments, to act as associates in the proposed examination; and with much satisfaction they announce as the gentlemen accepting their invitations:—Prof. John Steele; Prof. James Renwick, of Columbia College; Martin E. Thompson, Esq. Architect; General Thomas W. Harvey; and Charles W. Copeland, Engineer U. S. Navy. And your Committee, in conjunction with the gentlemen above named, have unanimously concurred in the conclusions which they now have the honor to submit.

In the prosecution of their labors, every facility within the power of the Board of Water Commissioners, and of the Aqueduct Committee of the Corporation, has been afforded; and it is but just to observe, that although differences of opinion have to some extent existed among gentlemen upon whom important trusts devolved in relation to the matter under examination, but one motive seemed to govern all—a sincere desire to arrive at truth, and to do justice to the great and paramount interests of the public.

Your Committee have considered the subject in reference to all the circumstances brought to view, particularly as to the kind and quality of materials, workmanship, liability to derangement or damage, quality of water, necessity of certain and efficient action, and of a proper galvanic arrangement, and in addition to a careful consideration of the principles involved in questions submitted to them, full and elaborate explanations have been made, and the practical observations of numerous witnesses have aided in forming the opinion expressed in relation to the merits of the two stopcocks.

In the subjoined remarks, the specimen No. 1 is the kind adopted by the Water Commissioners, the model of which was obtained from those in use in the water-works of Philadelphia. It may be briefly described thus:—A chamber is formed by bolting together two similar elongated cast-iron boxes, through flanges at their corresponding edges. On the opposite sides, when thus bolted, faucets project, for connecting the stopcocks to the line of pipes, and an internal projection comparing with the section of the faucets, forming seats for the valves, which are faced with brass and accurately ground. In this chamber the valve is intro-

duced, which consists of a disk of cast-iron having brass facings, and formed with a slight inclination or wedge shape, so as to fit closely between the seats of the chamber, when its axis coincides with that of the faucets or pipes; and the top of the chamber, which is high enough to allow the valve to be raised its whole diameter above the bore of the pipes, is closed by a plate bolted to a projecting flange. The valve is raised by a rod attached to its upper edge, and passing through a stuffing box in the plate which forms the cover of the chamber, and to the upper end of the valve rod is attached a screw. This screw is moved by a nut which is fitted in the top of a wrought-iron gallows frame, and this latter is fixed upon the cover of the valve chamber.

The kind denominated No. 2, is the one adopted by the Committee of the Corporation, and is constructed upon the same general principles, but differing in the following particulars, viz: The valve has one instead of two faces, and acts upon but one seat in the chamber; a wedge is adapted to the opposite side acting at two points near the edge of the valve, and is worked by a screw which is placed within the chamber, having a compound action upon the valve and wedge. The upper end of the screw, to wit, where it passes through the cap, is packed, to prevent leakage, by means of an ordinary stuffing-box, and is terminated by a square fitted to receive the eye of a wrench; the lower edge of the valve is beveled for the purpose of more easily penetrating the earthy concretions at the bottom of the chamber; a larger space is made at this point to allow the sediment room for escape, should any collect in the groove to interfere with the closing of the valve, and having no gallows or appendages above the stuffing-box, it is more easy of access for the purpose of packing; but this latter convenience is, in the opinion of the Manager of the Philadelphia Water Works, a poor compensation for the rapid decay to which the screw is subjected by the action of the water. And as the screw does not change its place when moving the apparatus within the chamber, no opportunity is afforded in this cock for ascertaining the position of the valve, except when it reaches its highest and lowest points.

It appeared in evidence that difficulties have from time to time attended the use of stopcock No. 1 in this city: several affidavits were read before the Committee to this effect. Your Committee are satisfied also that there has been much cause of complaint in those heretofore constructed for the use of the Corporation. They have been faulty in their proportions and workmanship, and defective in their materials, and men have been employed in the adjustment and use of them who have not therein always exercised a sound judgment. Upon this point your Committee submit, as a part of their report, a recommendation that whatever description of stopcock may be henceforth adopted, the working of them be entrusted to no other hands than those of skilful mechanics, and that the whole be placed under the superintendence of a competent engineer. On this head we would urge the experience of the city of Philadelphia, where stopcocks, no better than those constructed in this city for the Water Commissioners, have not been known to fail with the experience of fifteen years, when used by the workmen who originally made them.

Several of the witnesses ascribed the difficulty to the presence of a

collection of sediment in the groove or recess of the chamber forming the seat of the valve, which has prevented the proper closing of the same, and it appears that they were never subjected to any preliminary proof before putting them into use; so that under the circumstances developed in the examination, it is not so surprising to your Committee that many of them have failed, as that any of them have answered.

It also appeared in evidence, that to shut off the water from any particular point, it is necessary to close two stopcocks, and often four; it is therefore apparent that one or more of them must act against a reverse pressure; but in the case of No. 2 this would be difficult, especially when under the increased pressure of the Croton head; for as the valve acts against the seat only in one direction, it may be by the pressure sprung from the seat so as to leak, or be subject to fracture, it being supported only at two opposite points near the periphery of its disk by the wedge; for a pipe of small diameter this would not be an insuperable objection, as the valve might in this case be strong enough to stand without deflection or fracture. Your Committee are, however compelled to conclude that the use of stopcock No. 2, in any of the larger sized pipes, would be very uncertain, and that the risk of fracture from this cause would be great.

In connection with stopcock No. 2, a valve screw has been presented formed of iron, and coated with zinc, it has also a plate of copper, which covers that part of the rod which passes through the stuffing box.

This arrangement contains in itself three perfect conductors of electricity, grouped by the imperfect conductor water in which it is immersed. The zinc is positive to both the copper and iron, and will throw negative electricity upon the latter, and protect them from oxidation so long as the zinc lasts.

It must however be considered, that a coat of zinc of so little thickness would soon be converted into an oxide, and from that time, in consequence of its local position in respect to the copper, the iron of the screw will be taxed with the oxygen of the simple pair that remains; for the iron will now be positive, and the copper negative. The duration of the first (the zinc) would probably be from one to two years; of the latter, as a screw, not more than ten years. In respect, therefore, to the durability of the screw, stopcock No. 1 has a manifest advantage. It is however suggested, that by making the screws of an appropriate alloy of copper, the want of durability might be obviated.

Your Committee are of opinion that, while both stopcocks are liable to objections, when considered in all the circumstances of their present and future use, that No. 1 is the better and safer of the two submitted to them. It must however be well and carefully constructed; the surfaces of the principal castings which are joined together, ought to be planed, the several parts made uniform, and the whole united to the pipes by flanges and bolts.

In relation to stopcock No. 2, although your Committee consider it in its general principle of construction and operation inferior to No. 1, its introduction by those having charge of this department under the Corporation of the city is not matter of surprise. Those in previous use having in many instances proved inadequate to the purpose intended, and such failure having been imputed to some error in the principle of

their construction rather than a defect in mechanical workmanship or a want of care or skill in their using, it was proposed to remedy the difficulty by changing in some degree the general plan. In doing this, great ingenuity has been displayed, and an arrangement of parts conceived and adopted calculated to meet the supposed objections. The substitute appears, in the experience that has been had of it since its introduction, to have answered the expectations of its ingenious contriver, who is a manufacturer, and gives his personal attendance when it is used; and your Committee do not doubt but that in pipes of small dimensions cocks of this description may answer a good purpose. While they can see no advantage possessed as specially applicable to small pipes, which does not exist in like degree in the kind designated as No. 1, they cannot regard them as possessing an arrangement of parts justifying their application to pipes of large dimensions, and the more especially in the control of water under the circumstances contemplated on the completion of the Croton Aqueduct.

With respect, therefore, to the plan of stopcocks, adopted by the Water Commissioners, we conclude that it has the requisite qualities for the safe and effectual control of the Croton water in the mains or distributing pipes through the city, and that the principal difficulties which have hitherto attended its use for this purpose have unquestionably arisen from imperfections of workmanship in the making and a deficiency of skill in using it.

Connected with the best form of stopcock is the subject of the proper material for its construction. On this point your Committee, from the practical knowledge of its own members as well as from the confirmation of the evidence adduced, are of opinion that among the many varieties of cast iron, selections may be made that will answer the purpose, and that they may be furnished from either a blast, an air or a cupola furnace.

The question of economy, whether in first cost or durability of the article is an important consideration.

Much and highly respectable evidence has been adduced to show, collaterally in view of the whole system of pipes, that iron of the first fusion is equal or better than iron remelted—the case of the Swedish cannon which were shown to be cast at the first fusion of the iron has been cited as proof. Your Committee are, however, aware that the Swedish iron ores are of a quality of peculiar excellence for the casting of ordnance, and hence, that until the art of smelting was improved, Sweden was the only country in Europe in which good iron cannon could be made. It is now notorious that in England, for nearly fifty years, cannon of equal quality to the Swedish, have been manufactured from remelted iron and of ores very inferior to those of Sweden.

Your Committee are also aware that the art of smelting has made little progress in Sweden, and that it is possible to diminish the strength of iron by unskilful remelting.

All the experience of founders in the United States, has shown that by a proper selection of pig iron, a greater strength may be given by remelting; and moreover, it is well known, that while the working of a blast furnace is so capricious that no uniformity of quality can be depended upon, a good founder can obtain from the cupola, with certainty,

such variety of cast iron as the particular purpose to which it is to be applied demands.

In conformity with this view of the subject, the testimony of every practical man examined before this Committee, has been in favor of remelted iron both for castings of stopcocks, and also for water pipes. Your Committee would therefore advise and strongly recommend that in the works for the introduction of water into our city, the body which has charge of that important trust, act upon the practical experience of our own country deduced, almost daily, from the construction of steam cylinders, hydraulic presses, &c. and about which there is little or no difference of opinion among practical founders who give the preference to iron carefully selected and remelted in cupola furnaces.

Your Committee having thus stated the result of their examinations and reflections upon the point submitted to them, might consider the duty imposed upon them fully discharged. They however feel called upon to avail themselves of the present opportunity to state that while engaged in the investigation especially imposed upon them, their attention was drawn to a proposed modification of plan No. 1, which promises as your Committee believe, greater economy of construction, fewer joints when made, and an increased facility in the manner in which the valve is brought up to its seat. This cock, which we have denominated No. 3, differs from No. 1. in two particulars, the first of which applies only to the mode of forming the chamber of the stopcock and does not introduce any new principle. As stopcocks have been constructed heretofore, it has been usual to form the chamber of two parts which when the valve seats were fitted up, were bolted together and made tight by a lead joint. This course was pursued for greater convenience both in the casting and in fitting up the valve seats. It is now proposed to make the chamber in one casting, having projections in the interior corresponding with the section of pipe to which the cock is applicable, so that when fitted up and faced they will form the seats against which the valve in place will close and shut off the water; these facings will, in a twelve inch cock, be about four inches apart and may be either parallel or inclined, but it does not appear to us that any important advantage will result from their being inclined; the mere pressure of the water will be sufficient to secure a tight valve, without the additional aid of the wedge as employed in both the others. Another point of difference is in having the valve attached at its centre instead of its upper edge for the purpose of giving greater ease of adaptation. To do this it is proposed to make the valve of two circular plates connected only at several points near the circumference; the two plates and connections being all one casting. The plates at the centre will be from one and a half to two inches apart. A hole is drilled through the two plates at their centres and the valve rod is fitted up with an eye, the diameter of which is rather greater than the hole in the plates; the end of the valve rod is introduced between the plates, and where the holes in the plates and the eye of the rod coincide a pin is made fast and water-tight in the plates. On this pin the valve will not only be free to move but will be at liberty to take any angular position, limited only by the difference of the diameter of the eye of the valve rod and the pin passing through it. It is well known that ordinary mechanical skill is sufficient to construct

metallic valves of large dimensions so as to be water tight, such, for instance, as of all forms of steam and air valves; and the only difficulties which oppose their use in stopcocks, under even a low pressure, is their liability to oxidize under water. Well known laws, which govern galvanic action, enable us to say that the faces of the valves which are exposed to the constant action of water, may be very perfectly protected from oxidation by a proper arrangement of the metals which compose the galvanic group. In the construction of stopcocks, two metals only should be employed; and that which is positive should be the largest mass, to insure durability. For instance, if copper, or copper slightly alloyed with tin, be used, the copper being negative to the iron, the oxidation procured thereby will be distributed over the whole mass of iron composing the pipes; while if a metal positive to the iron be used, (with a view to protect it from oxidation) the positive metal can be employed only in quantities so small that it must soon be destroyed: if therefore the valve and seat be formed with copper, or copper slightly alloyed with tin, to give hardness, and a similar metal be used for the valve rod, their freedom from oxidation will be complete.

This plan of stop cock, your Committee take the liberty to recommend to a practical test, believing that in its form and manner of construction are combined more good qualities than are possessed by any other stopcock with which they are acquainted.

All which is respectfully submitted.

AMERICAN INSTITUTE, New-York, March 31st, 1841

The foregoing is a Report of the Committee on Manufactures of this Institute, which was duly accepted and adopted by the Institute, March 15, 1841.

G. R. J. BOWDOIN,
Recording Secretary.

FINE ARTS.

Mr. E. D. Marchant, after an absence of three years, has reestablished himself in this city, at No. 17 Park place, and exhibits a large collection of fine portraits painted during his absence, among which are those of President Harrison, the Hon. Henry Clay, and many other eminent statesmen. That of the Hon. John Quincy Adams we consider a masterpiece; it more resembles the style of Stuart than any portrait we have seen for a long time. Notwithstanding the high praises bestowed on Mr. Marchant by the southern papers, and the consequent reputation which preceded his return, his friends have been agreeably disappointed with his improvement.

T. S. Cummings, N. A., has just finished a miniature portrait

of D. E. Tylee, Esq. It is a most accurate likeness, in his best style. The peculiar exactness of the drawing, squareness of shadows, quiet though forcible tone and arrangement, entitle it to be classed with his best works. We hope it will occupy a place in the coming exhibition of the the National Academy.

For the American Repertory.

LYCEUM OF NATURAL HISTORY.

OFFICERS—1841.

President,	JOSEPH DELAFIELD.
First Vice President,	J. AUGUSTINE SMITH.
Second Vice President,	ABRAHAM HALSEY.
Corresponding Secretary,	JOHN H. REDFIELD.
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J. W. DRAPER, J. G. BELL.

PROCEEDINGS.

May. The President read a communication from Doctor Feuchtwanger, respecting a mineral labeled sulphate of magnesia, and phosphate of alumine, from South America, which the latter presented: referred to Dr. Draper for examination and report.

Mr. Mapes gave a brief description of a method employed by a manufacturer, in New Jersey, of consuming the smoke and getting rid of the incombustible gases generated by the consumption of fuel in the furnace under his steam boilers. Behind the bridge wall a number of perforated plates are placed horizontally and covered with gravel; the volatile products of the furnace, in passing over this gravel, become separated, and the incombustible gases, from their greater specific gravity, filter through and escape at a small opening in the rear wall, while the inflammable portion, with an additional supply of atmospheric air, is returned to the ash-pit by a blowing apparatus. He also gave an account of some remarkable properties of steam

observed by a gentleman of this city, Thomas Ewbank, Esq. in a series of experiments with the *blowing syphon*, an instrument of Mr. Ewbank's inventing, in which a vacuum is produced by forcing a current of air downward through a tube that encircles the end of the discharging or long leg of the syphon, extending above and below it for a short distance, and leaving a small annular space about the leg for the passage of the air. When steam was used instead of air to create a vacuum, the degree of exhaustion was observed not to depend upon the quantity of the steam forced through, but upon its velocity, and to be greatest when the aperture between the blowing tube and the syphon was too small for water to pass freely through it.

Mr. Wheatley presented a specimen of magnesite from Staten Island.

Mr. Warden, of Paris, presented the Annals of the Museum from No. 24 to 73; the thanks of the society were voted to him.

Dr. Jay presented a specimen of Helix cephoides, Lea. from the Philippine Islands; and on behalf of Dr. Kirtland, of Ohio, the following shells:—Unio occidens, U. Schoolcraftensis, U. elegans, U. lachrymosus U. rubiginosus, U. gracilis, U. luteolus, U. zigzag, U. tenuissimus, from the Ohio canal at Cleveland; also, a mounted specimen of Tringa rufescens.

Dr. Brinckerhoff presented a lion's skin from Africa, several nodular pyrites, a Gryphæa, and the fragment of an elephant's tooth from Texas.

Dr. Jay, to whom was referred the shells presented by Dr. Brinckerhoff, reported that the oyster was a new species; the other shells were specimens of the Bulimus albicans.

Mr. Brownne presented specimens of the Helleborus viridis, from East New-York, Kings county, Long Island. He stated that this plant had not been noticed by any botanist as growing in this country since the time of Muhlenberg, and he merely says that it is found in New-York, without giving the precise locality; it is probable, however, that Muhlenberg received his specimens from Long Island, and from the same place as those now presented, as there are only two places on the Island in which the plant is found.

The following works were received:—Bulletin of the Imperial

Academy of Naturalists of Moscow, from that Society; London and Edinburgh Phil. Mag. No. 103; Mag. of Nat. History, No. 40; Natural History Illustrations, No. 3; Audubon's Birds of America; and American Repertory, No. 4.

Mr. Albert Gallatin was elected resident member. B.

ERICSSON'S PROPELLER.

If any circumstance could entirely banish the regret we feel at having been unable to issue this number punctually upon its professed day of publication, it would be the opportunity afforded us, by the delay, to insert the following statements of the progress of the ship Clarion, on her outward bound voyage. The result, it will be seen, is a little more than 7 miles per hour, against the tide and a fresh breeze. When it is considered that the Clarion draws $11\frac{5}{6}$ feet water aft, and $10\frac{1}{6}$ feet forward, with a beam of $24\frac{1}{2}$ feet, and that her steam cylinders are only 28 inches diameter, with $2\frac{2}{3}$ feet stroke, and the steam pressure in the boilers only $7\frac{1}{2}$ lbs. to the square inch, we think the effect produced may be viewed as a great triumph, and the advantages thus secured to navigation and commerce second only in importance to the invention of the steam-engine itself.

Steamship Clarion, off Sandy Hook, April 14, 1841.

Capt. J. ERICSSON:

Dear Sir—The following memoranda of time and distance I send you by the pilot, who is now about to leave us.

	h.	m.
Left the Pier No. 1, North River, with a fresh breeze from the S. W. at	2	0
Passed Quarantine, Staten Island, at	3	0
Fort Richmond, a strong flood tide against us all the time,	3	20
Passed ship Louisiana bound out, under all sail, at	3	30
Engine making from 41 to 42 revolutions per minute, and working as smooth as oil. I feel no more jar or annoyance while writing this than you would feel in your room at the Astor.		
Passed buoy off the Upper Middle, at	4	20
Passed beacon on Romer, bearing E. N. E. distance $\frac{1}{4}$ mile	4	30
Sandy Hook light house bearing W. distance 2 miles, and the pilot takes his leave of us	5	00

We have not loosed a sail yet, and have had a fine chance to stow our anchors, &c. and get all ready for sea. I have not time to say more.

Yours, &c. E. DUNN,

Comm'r Steam Ship Clarion.

Capt. J. ERICSSON:

Sir—As it may be interesting to you to learn the success of the steamer Clarion while under my charge, I subjoin the following particulars:

We left Pier No. 1, North River, at 2h. 3m. P. M., and I left the ship at 4h. 50m., Sandy Hook light bearing west 2 miles. Distance sailed, 21 miles in 2 hours 47 minutes, without canvas, against a head wind and tide, with occasional snow squalls.

Very respectfully, your obedient servant,

JOHN TURNURE, *Pilot.*

New-York, April 15, 1841.

Legislative Proceedings.—During the present session of the Legislature of this state, a select committee was appointed upon the subject of agriculture, one of whose duties was to determine the ratio of distribution of the Agricultural Fund. The report of the Committee recently adopted fixes the ratio at three mills for each inhabitant, according to the census of 1840, and contains a clause recommending that the proportion due to the county of New-York (this not being an agricultural district) be divided equally between the Mechanics' and the American Institutes of this city.

CORRECTION.—In the first edition of the March number two errors occurred: At page 91, 21st line from top, for 40 read 5. At p. 100, the reference to the diagram, 15th line from bottom, should read thus: "at any point between the angles *b* and *d*; and that the effect of moving this lever through the space *b c*, as a weight," &c.

NOTICES OF NEW PUBLICATIONS.

Browne's Banking and Mercantile Tables; comprising Annuities, Simple and Compound Interest, Discount, Exchanges, Coins, Weights and Measures, &c. &c. New-York: George F. Nesbit. 1841.

This ingenious and excellent work appears to be exactly adapted to the wants and convenience of every business man who has anything to do with the increase of property. It is compact in its form, easy to comprehend, expeditious and unerring in its results, and applies without limit to all supposable cases of annuities, interest, or discount which may occur within the range of business in the United States. Until this work has been seen and fully examined, no one can conceive how much labor may be saved, which to bankers, brokers, merchants, mechanics, farmers, and particularly those who are interested in public stocks and real estate is very considerable; and even those who prefer to make their own calculations will find these tables an invaluable help to their operations. The interest and discount, as computed in this work, are predicated both on 365 days, or 12 months and 360, or 12 months of 30 days each to a year, and the calculations are carried in every instance to the nearest half mill. Such is the confidence of the author in the accuracy of his computations, that he feels assured in offering a premium of *one hundred copies of the work* to the person who shall first discover within the year 1841 an error exceeding *one mill.*

G. F. Nesbit has also published a Treatise on Distilled Spirits, with concise rules for Guaging, and various tables showing the specific gravity, bulk, quantity of spirit per cent, in different mixtures of alcohol and water, among which is a complete series of calculations of the per centage of liquors above proof, from 25 to 155 gallons, and from 1 to 75 per cent.

PROGRESS OF FINE ARTS.

Brief Observations on the State of the Arts in Italy, with a short account of Cameo-cutting, Mosaic Work, Pietra Dura, and also of some of the Domestic Arts and Mechanical Contrivances of the Italians. By CHARLES H. WILSON, *Esq. Architect, Edinburgh, A. R. S. A., and M. S. A.* [Read before the Society of Arts for Scotland, and communicated by it to the Ed. New Phil. Jour.]

[CONTINUED FROM PAGE 136.]

Having now touched upon those minor arts which have an intimate connection with painting and sculpture, I shall make a few observations on architecture, and the constructive and decorative arts which are connected with that science; but this I must do very briefly indeed, as otherwise I should occupy too much of the time of the Society.

The architects of Italy have but little scope for a display of ability, as the population is not on the increase, but, on the contrary, except in parts of the Austrian States, has shrunk away from the number required to occupy the palaces, villas and houses which already exist both in town and country; and this is painfully proved by the number of empty and dilapidated edifices. The various buildings which belong to government, the churches, colleges, and hospitals, have generally been built on a scale of magnificence which has never been excelled, in some instances never equaled, in other countries, but all betoken more or less the same melancholy decline. By this observation I do not mean to convey the idea that the buildings themselves are ruined or neglected; I allude to their emptiness, and to the absence of that state which once filled them with its splendor. To her honor, the hospitals of Italy have long been known for their number, extent and order, and these are still models in many respects. Although not *many* works, yet some of great magnitude are going on in Italy, and in these, taste in design, magnificence in material, and solidity of construction, are displayed. The restoration of the Basilica of St. Paul's at Rome is an immense undertaking. To effect it, contributions have been obtained from all countries, whether in money or materials. It is said that George the 4th subscribed; and I may mention that the façade of another church in the Eternal City has been built at that sovereign's expense, in a way which he must little have anticipated. When the celebrated Gonsalvi visited England, his Majesty presented him with a magnificent snuff-box, which the cardinal in his will directed to be sold, and the proceeds applied to put a front on a church which had for a long time been unfinished in that respect.

The passion which all pontiffs have displayed for building, still animates the less potent holders of St. Peter's chair of our day; and although inhabiting a palace which contains 22 court-yards, 12 halls of entrance, 22 grand staircases, and 1300 of various descriptions; two large chapels, and 11,000 rooms and galleries, in which miles may be walked without returning on the steps, yet each succeeding Pope adds or alters, or marks repairs with his sculptured coat of arms.

Although there is not much employment for architects in Italy, there can be no question of the skill displayed in erecting their designs. The

masonry is excellent, and the ancient Roman brick-work is rivaled by that of the present generation; houses are built of brick, in which all the exterior decorations are moulded in that material as perfectly as if executed in stone. The skill with which the Italian workmen build in brick may be exemplified by a notice of the Florentine practice of arching over rooms without centering of any description. Two thin moulds of board, the shape of the intended arch, alone are used; these are placed at each end of the apartment which it is intended to cover in, and pieces of string are stretched from the one to the other, guiding the workman as he advances in the formation of his arch, which he builds, uniting the bricks by their thin edges (greatly thinner than in those we use) and trusting entirely to the tenacity and quick setting of the cement.

Plastering is carried to a perfection in Italy of which we have, I believe, no idea in this country; rooms are so exquisitely finished, that no additional work in the shape of house painting is required, the polish of the plaster and its evenness of tint rivaling fine porcelain. At times the surface of the plaster is fluted, or various designs are executed in *intaglio* upon it, in the most beautiful manner. Scagliola, a very fine preparation from gypsum, is the material chiefly used.

As an instance of the cheap rate at which this work is done, I may mention the new ball-room in the Palazzo Pitti, grand-ducal residence at Florence, which, including mouldings, figures, bas-reliefs, and ornaments, was executed at a cost of two crowns for every four feet square.

Work in scagliola naturally follows in my notice of the arts of architectural decoration; but this I need not describe, as the art is now practiced in England with great success, and an artist has lately settled in Edinburgh, whom I earnestly hope may meet with encouragement. A most beautiful art may be mentioned here, in connection with the last; I mean that of making what are termed Venetian pavements, which might advantageously be introduced into this country. The floors of rooms are finished with this pavement, as it is somewhat incongruously termed, and I shall briefly describe the mode of operation in making these, but must first observe that they are usually formed over vaults. In the first place, a foundation is laid of lime mixed with pozzolana and small pieces of broken stone; this is in fact a sort of concrete, which must be well beaten and leveled. When this is perfectly dry, a fine paste, as it is termed by the Italians, must be made of lime, pozzolana and sand; a yellow sand is used which tinges the mixture; this is carefully spread to a depth of one or two inches, according to circumstances. Over this is laid a layer of irregularly broken minute pieces of marble of different colors, and if it is wished, these can be arranged in patterns. After the paste is completely covered with pieces of marble, men proceed to beat the floor with large and heavy tools made for the purpose; when the whole has been beaten into a compact mass, the paste appearing above the pieces of marble, it is left to harden. It is then rubbed smooth with fine grained stones, and is finally brought to a high polish with emery powder, marble dust, and, lastly, boiled oil rubbed on with flannel.

This makes a durable and very beautiful floor, which in this country would be well adapted for halls, conservatories, and other buildings. In connection with the arts which the architect summons to his aid, I

shall now notice that of ornamental sculpture; and here again we must acknowledge the superior skill of the Italians. The chief encouragement to artists of this description is that given by foreigners, especially by English travelers in Italy. Copies of ancient sculptures, vases, chimney pieces, and other ornamental articles, are executed in the most perfect manner, and at a very cheap rate. Such is the skill of the Italian workmen, that a native of Carrara actually cut a bird-cage in marble, which he presented to his sovereign the Duke of Modena, who, by the return he made, rather showed his sense of the folly of the sculptor than of his patient perseverance in the production of so useless a specimen of his skill.

But whilst the sculptor displays his skill in these comparatively trifling departments, he is equally successful in the execution of architectural details on the most gigantic scale, whether in solid marble or in veneer. By this latter art he produces magnificent columns plain and fluted, the core of which is of coarse stone, but the joining of the marble coating is so perfect, that the finished pillar seems a mass of solid marble. The marble is attached in a rough state to the core by means of a cement composed of resin and marble dust, which is so tenacious that it admits of the hammering, chiseling, and polishing necessary in finishing the work. By means of this system of veneering, the interior walls of churches and other buildings are incrusted with rich and varied marbles, and tables and other articles of furniture are manufactured at a very cheap rate. The art which I have just described is in fact that of pietra dura on a gigantic scale.

With the sculpture of the Italians in alabaster you must all be acquainted. This art is chiefly practiced at Pisa, Florence, and Leghorn. The material, besides being used in sculpture, is ingeniously applied in Rome to the manufacture of false pearls. The pieces of alabaster, after being turned and filed into the proper shape, are enveloped in a brilliant paste, made with the scales of a very small fish found near the shores of the Mediterranean.

To return to the subsidiary arts of architecture, I may remark, that the carpentry of the Italians, as observable in ordinary houses, displays little skill and indifferent workmanship; but in the roofs and floors of important buildings, they satisfactorily prove their knowledge of scientific principles, and several of their designs are well known to British architects.

With regard to the working of iron, in comparison with our system the Italian is primitive indeed; yet at times they can and do produce very good specimens of workmanship, but at a heavy cost; consequently they are generally content with very ordinary productions. A manufactory of wire, and of driving and screw nails, by means of machinery, *now occupies the villa of Mecænas at Tivoli;* the articles produced are very well made. Copper is extensively used in Italy, and there are productive mines in the *Maremma Toscana.* The workmanship of articles made of this metal is respectable; various utensils are made of brass in a very neat and satisfactory manner, but in the interior finishing of houses, if much nicety is required, articles of foreign manufacture are used.

House painters may be mentioned in the last place, and these display

much taste and skill; and there is a class of them who greatly excel those in this country, having more the feeling and taste of artists. Surrounded by the finest models in this art, the Italian decorator enjoys every advantage in its study, and he inherits besides from the best periods of art, or rather from all antiquity, taste and a good system of workmanship. He is not a mere machine like the workman in this country, who has little use for an intellect beyond enabling him to use his moulds, stamps and the various mechanical contrivances which confine all our decorative arts within such common-place limits.

In all old architectural drawings and engravings, we find a vigorous artist-like style, which is reflected in the works done from them. In the architectural engravings of the present day, every thing is sacrificed to a display of dexterity in the use of the burin; the spirit of the original ornaments is never represented. How strongly this is illustrated, for example, in our engravings from Etruscan vases! Works executed from such engravings, or from drawings like them, are naturally stiff and lifeless like the models. People who possess a feeling of taste, dissatisfied with such productions, seek to replace them with older specimens, and amongst other things very inconvenient carved chairs and tables, in the workmanship of which they find a pleasure in tracing the influence of mind. But the cleverness in the workmanship of these specimens has greatly misled the taste of the day; and the abominations of Elizabethan architecture, lately dignified with the name of the *Renaissance* style, of which however it is a mere caricature, the extravagancies of the Louis 14th and 15th eras, or the debonnaire barbarisms of Watteau, have contributed to the banishment of a healthy taste in style. To restore a feeling for better art, the purer styles of classic or gothic art must again be executed in the spirit of better times, and to grace of form must be added feeling in execution.

I shall now turn to the engineering works of Italy, a subject worthy of much attention, but on which, I regret to say, I am able to say very little indeed. The greatest works I saw going on were those at Tivoli, and from the Ombrone to the Lake of Castiglione in the Tuscan Maremma. I shall merely offer a very brief description of these works, necessarily very imperfect, as I write entirely from memory. The Tiber or Aniene, on reaching Tivoli, was dammed up by the architect Bernini; precipitating itself over the lofty barrier he raised, it disappeared under the rocks on which the town is built, and was seen again in the celebrated grotto of Neptune; rushing out of this remarkable cavern, it fell into another abyss, and again vanished into the grotto of the Sirens, from whence it issued in the deep valley under Tivoli, several hundred feet below its original level. The pencils of the painters of every nation have been employed for centuries with this, I may say, terrible scenery, this *orrido bello* of the falls of Tivoli. They may now depict the rocks, but the waters are gone for ever. Some years ago, Bernini's dam was carried away in a flood: it was rebuilt by the Pope's engineers; but, if I remember aright, the river got the better of them, and threw down their work: at last they dammed up old Tiber, and made the very ugliest waterfall that ever unfortunate artist contemplated. It was discovered that the river, in passing through Neptune's grotto, had worn away the rocks in such a manner that the town and its temple

depended on a rugged pillar, the duration of which could not be calculated upon. To prevent the town paying a visit to the Sirens beneath, it was resolved to turn the river, and it will be acknowledged that this was a bold undertaking: walled in by mountains, it sought a passage under them; and to a certain extent imitating the operations of nature, the engineers have carried the river through two parallel tunnels, and tumbled it into the valley beyond the Sirens' grotto, over a bank twice or perhaps three times as high as the Calton hill. I have made a plan from memory of this operation, as the best mode of explaining it. The engineers have saved Tivoli, but its romantic beauty, as far as the river is concerned, is gone for ever.

The other engineering work which I mentioned, namely the canal from the Ombrone to the Lake of Castiglione, has excited much interest. The Lake of Castiglione, anciently the Lacus Prilis, falling very low in summer, left much marshy ground uncovered, in which were numerous stagnant pools, and quantities of putrid herbage, making the air poisonous in hot weather, and breeding myriads of noxious insects. To remedy these evils, Leopold 1st ordered his architect Ximenes to make a canal from the river Ombrone to the lake; by this means it was intended to keep the latter constantly at the same level. This work was finally executed by the present Grand Duke in the year 1830, and by means of a canal 7 miles long and 25 feet broad, a sufficiency of water is supplied to keep the lake at a proper level; so sufficient indeed was the supply, that the whole surrounding country was overflowed the first year; but this has been remedied The air, it is said, has been improved; but when I visited Castiglione in 1832, I found that all who could left it in the summer months, and all who remained had the fever. Some notice may be expected from one of the engineering works in the Pontine Marshes; but like other British travelers, I have only galloped through them, and have merely to state that the attempts to drain them cost a million of money.

The roads in the north of Italy are excellent, and indeed generally throughout the peninsula. Although a small portion comparatively of the country is intersected by roads, I have traveled many miles over turf, or by small tracks on the coast or on the mountains. Towns are almost universally built on eminences; consequently the roads are hilly, but I think less so than would be supposed from the nature of the country, and both in direction and in smoothness they greatly excel those of France.

The system of road making followed is nearly the same as that adopted by the late Mr. Telford, that is to say, a pavement of stones is first formed, upon which the metal is laid;* but I do not think that the principles advocated by our great engineer are followed out in the

* I have not seen the railroad which has been lately made from Naples to Castellamare, but am well acquainted with the line; a novel question in engineering must arise in considering how it is to be protected from the lava of Vesuvius. This I believe will not be very difficult, but it has a more insidious enemy in the earthquake, and a more overwhelming one in the showers of scoriæ and ashes which accompany an eruption.

Railways may be useful in Italy to promote her commercial prosperity, but I pity the man who could think of traveling in such a manner through any part of that country.

formation of the pavement. Excellent roads, however, are the result of the system, even although gravel is used instead of broken metal.

Various principles of paving are now exciting much attention in London; it is to be regretted that something like a sensible principle is not followed in Edinburgh. In Italy various modes are adopted; in Genoa and at Naples large flat parallelograms of lava are used; at Florence, large irregular polygons carefully jointed; and at Rome, a pavement resembling our own, except that the stones are of regular forms, of one size, and grouted in with lime and pozzolana.

I shall now touch very briefly on a few arts of Italy which remain to be described, and shall then take the liberty of bringing before you one or two contrivances which struck me as ingenious, and of which I have prepared drawings.

The goldsmiths of Italy produce ornaments which are both remarkable for taste and workmanship, especially those of Genoa and Venice. I am enabled to show you some trifling specimens which our workmen cannot equal.

After the goldsmiths I may mention the makers of bronze ornaments and figures: this is an art in which the Italians show much taste and dexterity—so much dexterity, indeed, that they sell numbers of antique bronzes of modern fabric yearly to *soi-disant* antiquaries, who, however, neither possess that extensive learning nor profound experience and correct taste necessary to constitute such a character. It is much the practice in Rome to take moulds from real lizards, and to cast them in bronze: these make very pretty ornaments for the table. I regret that I am unable to give you an idea of the value set upon these works.

The manufacture of glass is pursued with great success in Venice: the numerous glass ornaments for ladies which come thence are well known, and the endless varieties of form and combinations of color given to glass beads for rosaries and embroidery, or vessels for domestic use, are very ingenious and beautiful. The ruby glass of the 1500 and 1600 can now be imitated so as to make imposition a famous trade, the false being only distinguishable by weight. Glasses are also made in which white threadlike lines of arsenic are incorporated. The process by which they make sheet-glass differs from ours. Instead of being formed into immense circular sheets, the Venetian workman blows cylinders of considerable length and diameter; he then cuts off the two ends of his cylinder, dexterously slits it down one side, and spreads it flat on a table in an oven. By this process sheets of a sufficient size are made, and there is no loss as in those fabricated in this country.

I think that I have lately observed that the process which I have thus briefly described is practiced at some manufactory in England.

The velvets of Genoa, and the exquisitely turned ware of the same place, the straw hats of Tuscany, the silks of Florence, the embroideries of Rome, the musical instruments and musical strings, and although last, not least, the maccaroni, of Naples, are all samples of skill creditable to the Italians. As I never met any one who could guess by what process maccaroni is made into pipes, I have made a drawing of the copper plate through which it is squeezed, in case any member of the Society should wish to understand it.

I shall now request your attention to the lithograph of a triumphal

arch. It is a specimen of an art in which the Italians display both taste and great ingenuity, and which seems to me deserving of notice, for although it may be deemed useless by some, yet it contributes largely to their happiness: I allude to their preparations for festivals and pageants. Without entering into any description of these, I shall content myself with exhibiting a print of a triumphal arch erected at Tivoli on the occasion of a visit from his Holiness the Pope. Erections of this description are put up in a day or two, being formed of a framework of wood, covered with coarse canvas painted in imitation of stone. The bas-reliefs are of stucco, and the statues are formed of straw, arranged round wooden supports: casts of heads, hands and feet are easily procured and attached. This *anima* (soul) as it is termed, is skilfully enveloped in drapery of cotton cloth, which is tastefully arranged by an artist, and is then lightly brushed over with whitewash, which stiffens it. That a knowledge of the art displayed in erecting this arch may be useful, may I think be proved, by an allusion to the gallows-like erection under which his majesty George 4th passed when he entered Edinburgh.

I now beg your attention for a few minutes, whilst I describe the next drawing. In the summer of 1833 I made a journey from Leghorn to Rome along the coast, a *terra incognita* to most travelers, my object being to trace the Via Aurelia. At Orbetello, the last town in the Tuscan States, besides making some interesting antiquarian discoveries, I observed the boats which I am about to describe. Orbetello stands upon a peninsula, projecting into a shallow lagoon of some extent; the boats which are used upon it are flat-bottomed, rise considerably at the bow and stern, being lowest at midships, across which part of the vessel a beam is fastened, about four inches thick each way, and which projects about two feet six inches over each side. On each of the ends of this beam an oblong piece of plank is nailed, the longest sides being horizontal, and a stout pin rises from each of these. The oars are of considerable length in proportion to the boat, and of great breadth in the blade, which is of the form shown in the drawing. The oars are of considerable length in proportion to the boat, and of great breadth in the blade, which is of the form shown in the drawing. These oars rest upon the pieces of board at the ends of the cross-beam, being attached to the pin by means of a piece of cord, in this last respect resembling a mode adopted in boats on our own coasts. The blade of the oar slightly overbalances the portion within the fulcrum on which it rests, the handles nearly touch each other, meeting amidship. By this contrivance, one man can manage a pair of very powerful oars, and can drive a boat, which is apparently but ill adapted from its form for speed, with surprising rapidity through the water; he can arrest its progress, or turn it with equal rapidity and certainty, and with very little exertion.

My knowledge of boats and ships is indeed very trifling; but I could not help seeing how easily the fisher of Orbetello manœuvred his rude boat; and therefore I have been induced to bring forward this notice of a vessel and mode of rowing which I am not aware has been described. Besides, it suggests ideas as to the probable mode in which the ancients managed their triremes, well worthy the attention of the antiquary, especially if he will combine the hint thus obtained with the modes of

rowing followed in the Bay of Naples on board the Sorrentine boats, which, I have been led to imagine from an examination of pictures in Pompeii, are much the same in every respect as the galleys which in old times navigated the same sea.

My next drawing represents, by means of a section, an apparatus used in Italy for warming baths. I need not describe it, but shall merely observe generally, that it is made of copper; the live charcoal is put upon the grating, which is put into the stove by means of the handle; the fire is kept alive by air supplied through the tubes; and when immersed in the water of a slipper-bath, this light and portable apparatus will heat it in a quarter of an hour. I think it might be useful in this country.

In the same drawing I have introduced the ladders used by architects in Rome in measuring the antiquities, and by the fire-brigade. Probably these are known here,* yet we see immense and heavy ladders carried about which these Roman ones would better supply the place of; they can be used in one, two, or half-a-dozen lengths, as may be required, are very easily carried, put together in a minute or two, and would be very useful in cases of fire. With regard to fire-escapes, a Roman apparatus has been brought to my recollection by several London fires lately described. On these lamentable occasions six or seven lives were saved by the simple expedient of individuals beneath holding a blanket, into which the sufferers jumped, and thus reached terra firma in safety, even from top stories: on one occasion lately, I observed a man, his wife and child, saved by the use of a watchman's great-coat to break their fall. At Rome, the fire-brigade is furnished with a large sheet of sailcloth bound with rope, in which loops are left at convenient distances. At every review of the men, by way of setting an example to the Roman citizens, and showing them what to do if burned out, every fireman jumps from the second story of some chosen house into this sheet: shouts of applause greet the skilful jumpers, and roars of laughter those who precipitate themselves down in a less graceful manner. I think that we might take the hint, especially as late fires in London have proved the use of this cheap apparatus.

I now close this paper, with many apologies for having detained you so long. The engineering works I have briefly described may seem trifling as compared with those extraordinary and gigantic operations you are accustomed to in this country; but I would ask you to consider the relative extent, power, and resources of the states, and you must then allow that they are very creditable to the Italian Governments.

The Italians, we have seen, are still remarkable for their taste and skill in many beautiful arts, and for nearly 3000 years they have been thus distinguished. Various arts were successfully practiced by the Etruscans, and when they were subdued by the ruder Romans, they did not lose their skill, but enlightened their masters.

The conquest of Greece filled Italy with artists and works of art; and when northern hordes overwhelmed the empire, these ruthless

* I am informed that the scaling ladders used in our army are of the first description. The second is the ladder used by the Roman fire-brigade, being very light, and is hooked over a window sill. I have often seen men ascend into houses by means of this ladder.

barbarians were gradually softened by the fine arts of the people they had conquered. A new power arose in Italy, and by its influence again she became preëminent in Europe, and we know to what illustrious perfection the fine arts again attained.

In our sale-rooms we see sold every winter many cracked and dingy daubs; and with these before him, the auctioneer rings the changes on some half-dozen names, as if the Italian school could boast no more; but a host of artists attest the fertility of Italy in the production of men of talent; and in Lanzi's dictionary, 1000 names will be found before the reader reaches the middle of the letter D in the index.

I have imperfectly described to you some of the arts which the Italian has inherited. I shall close this paper by observing that, whatever public work is undertaken in Italy—wherever improvement is contemplated, even although it should not be extensive—it is justly thought that the assistance and advice of the artist, whose taste and judgment have been cultivated, ought to be secured; and there is no practice in *its full extent* more worthy of our imitation.*

PROGRESS OF SCIENCE.

Popular Views and Economical Applications of Geological Science. *By* W. E. Hall. [From the Mechanic and Chemist.]

The grand objects of geology are, to unfold those adjustments of inanimate nature which are calculated to display the wisdom of the creation; to propound to the inquiring mind an infinite variety of questions and speculations connected with the causes of the effects which we now perceive, with the events which they announce as having happened at remote and obscure periods of the history of the earth; and with the various revolutions and changes which our globe seems destined to undergo by the continued operation of the powers now active, and by that perpetual warfare of the elements to which its surface is continually submitted. When considered in these respects, who will not subscribe to the opinion of Sir J. Herschel ("Discourse on the Study of Natural Philosophy") that "Geology, in the magnitude and sublimity of the objects of which it treats, undoubtedly ranks, in the scale of sciences, next to astronomy?"

Even when regarded in its secondary applications, geology is not destitute of great interest; for it embraces a variety of useful and popular information. In mining, in the search for coal, in the structure of canals, railroads and common roads, in building, draining, and in the judicious search for and management of springs, the advantages of practical geology are incalculable. To the traveler this science opens, as it were, a new creation. The charm of rural landscapes, the romantic pleasure of mountain prospects, and sequestered dells and waterfalls, are but feebly appreciated by him who, unacquainted with the principles

* Mr. Wilson exhibited numerous specimens of mosaic, pietra dura, cameos of different ages in pietra dura, and specimens of shell cameos; also, of Genoese and Venetian jewelry, Venetian glass and ruby glass, together with numerous prints and drawings.

of art, has not learned to perceive in all the works of nature the operation of law, and to trace in all the diurnal aspect of creation the effect of many preceding revolutions. The greater features of physical geography are explained by subterranean movements and their consequences; the minuter proportions, which are the proper province of pictorial art, are partly due to other circumstances. The richness or desolation of countries, besides the obvious influence of elevation and climate, proximity to the sea, or snowy mountains, is not a little dependent on the chemical quality and texture of the subjacent rocks; for these, by their decomposition, have furnished in general the soil, which does not indeed feed, but is a channel of nutrition for the vegetable world.

Let any one, for example, compare the glorious trees and rich pastures of the vales of the Severn and Avon, situated on lias and red marl, with the stunted oaks and poor herbage of a great part of the broad vale of York, which is filled by gravel *drifted upon* the same red marls and lias; or, in the vale of York itself, contrast the finely wooded and fertile region about Thirsk, where these strata come to the day, with the naked plains between North Allerton and the Tees, and he will see the importance of attending to geology in estimating the agricultural condition of a country. Through a great part of England, the various ranges of secondary limestones have characters of outline and surface, by which they may be fully represented in a painting. Whoever has admired the Sussex Downs, or Yorkshire Wolds, will seldom fail to recognize, in other situations, those broad, rounded, and gracefully swelling hills, melting into gentle hollows, but smooth short herbage, and that pleasing though dry and treeless surface, which belongs to the chalk of most parts of England. Different from these in many respects are the tracts of the Gloucestershire and Oxfordshire oolites, with their tabular summits and intervening woody vales of clay, and the older limestones below the coal, wear other and bolder aspects, and all are different from the intersecting outlines and rugged surface of the primary strata of slate, mica schist, and gneiss.

But, besides these general characters of district scenery, it is a familiar truth, that every different kind of rock has peculiar forms in the mass, particular arrangements of the structural lines, and even modes of wasting and vegetable accompaniments, which are often attended to as pictorial effects, but which furnish to the geologist the farther enjoyment which arises from inquiry into the cause. By a knowledge of the divisional structures of rocks, a geologist can very frequently determine at a distance the nature of a rock, distinguish basalt from slate, limestone from sandstone; and thus his sphere of gratification from scenery is enlarged, his perception of the minuter lights and shades of the landscape becomes more vivid, and his memory of past combinations more enduring.

"Practice," says Professor Whewell, "has ever been the nurse of theory; art has ever been the mother of science—the comely and busy parent of a daughter of far higher and serener beauty." But the benefits are reciprocal: geology, at least, is capable of well repaying the large debt which it owes to the experience of the miner, the engineer, and the agriculturist; and, indeed, some of its truths are already largely productive of public benefit.

MINING—METALS.

Metalliferous veins (in Cornwall called *lodes*) are seldom visible at the surface of the ground, being generally concealed by the thick covering of alluvial matter, which is spread over almost every portion of the globe, and hides from our view the solid rocky strata in which they are inclosed. In some cases, however, where this covering is partially wanting, they may be distinctly traced at the surface; and still more frequently they are rendered visible by the indentation of excavated valleys, and the channels worn by mountain torrents. The same effect is often produced by cliffs on the seashore, where veins occur in that situation—of which there are many examples on the coast of Cornwall.

As metalliferous veins, however, present in most cases no trace of their existence at the surface, certain general indications must be resorted to for their discovery. The most general of these indications are furnished by geology, which teaches us that certain metals are most abundantly found in certain rocks;* and farther points out that they do not occupy any position indiscriminately in those rocks, but are almost exclusively found near their junction with other rocks of a different character, more especially near the contact of igneous masses with sedimentary strata; and that they commonly occur when rocks alternate together, and are broken and dislocated. Thus, according to Mr. R. Fox, ("Summary of Phenomena in the Veins of Cornwall," Report of Polytechnic Society, 1836) the tin and copper veins of Cornwall are situated chiefly in a species of clay-slate, provincially termed *killas*, and either near its junction with protruded masses of granite, or where it is intersected by channels of a porphyritic rock called *elvan*. In Wales and the north of England, the lead veins are chiefly situated in the carboniferous limestone and rocks associated with it, especially in places where they are intersected and broken up by enormous flaws and dislocations. Similar circumstances to these are very generally observed in all parts of the world; and it is also well ascertained, that the local enrichment of veins is greatly influenced by their intersection with one another, and often, indeed, closely corresponds with the points of junction.

Coal.—Two things have been established by geological research, in opposition to the contracted experience of colliers:—First, it is perfectly ascertained, that coal is limited in Europe and America, almost exclusively, to one portion of the series of strata; secondly it is demonstrated, that coal occurs in abundance, and of excellent quality, beneath large tracts of country, where few or no indications of its existence appear at the surface. In the practical working of coal which has been discovered, geological principles may often be useful in determining its probable extent; but their main value is in the discovery of coal in new situations, and the arresting of costly and fruitless trials for coal, where it cannot be found. In countries where coal has long been worked, almost every district has been explored, at least nearly to its boundaries. This is at present the case with England—indeed gener-

* It does not appear that nature has confined particular metals to any exclusive kind of rock, yet traces of a general association are observable. Thus tin, copper, gold, silver, and certain deposits of iron, are most abundant in the class of rocks usually termed primary; while lead, zinc, mercury, and the earthy ores of iron are most abundant in the older secondary rocks.

ally in Europe; and, consequently, it may be thought that the time has gone by for the geologist to be of service. But facts prove otherwise. Only sixteen years ago, a valuable estate in Durham was pronounced by the practical men of the great northern coal fields, to be devoid of coal, "because it was situated on the magnesian limestone;" and might have been sold under this opinion, but that Dr. William Smith, of Churchill, in Oxfordshire, a geologist of celebrity, showed the falsity of the reasoning, reported favorably of the probability of finding good coal in abundance beneath the property, and advised the proprietor to work it. The estate is now called the South Hetton colliery, and is the centre of a rich and well-explored mining tract, all situated beneath the magnesian limestone; and this result was the fruit of scientific geology. This instance is one of a large class.

Although all the strata of Radnorshire, Wales, are inferior to (i. e. lie under) the carboniferous rocks;* yet many attempts have been made in search of coal, which the majority of the inhabitants still believe to exist under the surface. The principal cause of this delusion has been been the dark, lead-colored appearance of a shale,† which exists in the neighborhood of certain trappean rocks; and, accordingly, where the trap rocks protrude, levels have been driven and shafts sunk, while a slight acquaintance with the principles of geological science would show such attempts to be utterly hopeless.

Ignorance of the same kind has been displayed at Bruton, in Somersetshire; at Bagley Wood, near Oxford; at Northampton; at Kirkham, and many other localities in the north of England.

Messrs. Conybeare, J. Phillips. and others, who possess an intimate knowledge of that part of the country, are of opinion that, under the red rocks of the midland counties, great tracts of coal remain for the public advantage and the triumph of geology.

Salt.—Until within the last few years, the great abundance of that very valuable mineral, common salt (chemically, chloride of sodium,) in the red sandstone and red marl of England, as well as in the contemporaneous rocks of Germany, produced a general impression that salt was peculiarly the product of that geological era; and it was assumed, without sufficient evidence, that all the well-known salt works of Switzerland, Poland, Spain, &c., drew their supplies from the "new red sandstone system." The inference was extended not only to the salt lakes and springs of European, but also of Asiatic, Russia, to the sands of Persia, and salt houses of Ormuz, and the salt-works of India, between the Indus and the Chellum. Even the American salt deposits were thought to belong to the new red sandstone formation.

The progress of geological information has corrected this error; for salt springs have been found to rise, in Durham and Northumberland and Leicestershire, from the coal system. Some of the salt-works of the Alps are supplied from the oolitic system. The famous mines of Cardona and Wielicska have been referred, the former to green sand,

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* The principal portion of the country is composed of the strata forming the Silurian system; but on the north and north-west sides, the upper beds of the older rocks, comprising the Cambrian system, make their appearance.

† Representing, perhaps, the Wenlock shale.

the latter to tertiary rocks; and, to complete the series, salt springs abound in the volcanic regions of Sicily and Auvergne.

Construction of Roads, Canals, &c.—In planning and executing public works, (such as canals, railroads, and common roads,) a knowledge of the rocky structure of a country ought to be considered indispensable; and the boring-rod is in continual requisition. But the engineer, who is also a geologist, will find a surer method of research, to trace the systems of strata across miles of country, than to merely feel by the chisel at so many points of a line. To fix the line of a road is the problem; and a knowledge of the geological structure of the country on a large scale, is one of the grand data for a true solution of it. When the line is fixed, the practical man will need minuter information than geology can give; but there will be many occasions for the exercise of this science, where tunnels and deep cuttings often show loose sands and other formidable things unexplored by the boring-rod, though not beyond the expectation of a geologist.

The choice of a line of country for canals may often be rightly governed, by attending to the series of strata, and the dislocations to which they are subjected; for thus the summit levels may often be conducted in argillaceous tracts, or in synclinal hollows, where not only no waste of water need be dreaded, but, by suitable trials, fresh supplies may be had at moderate depths from the surface.

From among many testimonials of the value of geology in planning public work (such as tunnels, &c.,) I shall extract the following:—Monsieur Brunel, in his prospectus of the Thames Tunnel, thus writes:—"While this operation* was in progress, I received an intimation from eminent geologists, apprising me of the existence of a bed of sand lying at a greater depth, and advising me to go as little as possible below the bed of the river. This information corresponded with the account given before by the drift-makers, respecting the existence of a quick-sand, and its depth below the level of high water. The shaft having been sunk to the depth of sixty-five feet, another smaller shaft, twenty-five feet in diameter, destined to be a well or reservoir, for the drainage of water, was also sunk for this lower level; but, at a depth of about eighty feet, the ground suddenly gave way, and sunk several feet at once, sand and water blowing up at the same time. Thus was the previous intelligence confirmed of the existence and the nature of the bed of sand in question, and which governed the engineer in the level he had proposed originally to take for his horizontal structure!"

Building.—The valuable assistance which geology can render to the architect in the choice of building materials, arises principally from the necessity which exists for a geologist to direct his attention to the various degrees of resistance to decay which rocks of different kinds present. As certain trees will bear the ocean air, even in our unfavorable climate, and others not—so with stone; it is not equally durable in all situations, but yields variously and unequally.

This failure may be attributed to two causes—the one chemical, and the other mechanical, which I shall distinguish by the terms *decomposition* and *disintegration*.

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* That of forcing a cylinder through a bed of gravel and sand.

Decomposition implies the separation of the component parts of a stone from each other, and, consequently, that some new combinations are effected. These combinations are brought about by water, oxygen, or carbonic acid gas. Stones containing such elements as are readily acted upon by these external causes, will be found most subject to decompose; and the process will be, in many kinds, much hastened by a loose texture.

Stones containing saline matter, are acted upon by water, particularly when the soluble salt is in considerable proportion; and, in some stones, the application of salt water soon destroys them. Dolomieu says, "The houses of Malta are built with a fine-grained limestone, of a loose and porous texture, which speedily moulders away when it has been wetted with sea-water."

Stones containing iron, which is not in a maximum state of oxidation, are often destroyed by the absorption of oxygen and carbonic acid; the presence of moisture accelerates their decomposition, and it is always still further hastened by increase of temperature. According to the observations of Kirwan, stones containing iron in a low state of oxidation, are of a black, a brown, or a bluish color; and, in some instances, when united with alumina and magnesia, they are of a grey; the former, as they become more oxygenized, change to purple, red, orange, and, finally, pale yellow; the latter become at first blue, then purple, red, &c. But stones containing iron, combined with its maximum of oxygen, do not readily decompose, such as red porphyry, jasper, &c. When stones contain magnesia, lime, alumina, carbon, or bitumen, in particular states, they are subject to decomposition, from the affinities of one or other of these bodies.

Disintegration is the separation of the parts of stone by mechanical action. One of its most powerful agents is the congelation of water in the minute pores and fissures of stones, which bursts them open, or separates small parts, according as the structure is slaty or irregularly granulated. The western and southern sides of buildings, in northern climates, are most subject to fail, because the surface is often thawed and filled with wet in the sunny part of the day, and frozen again at night. This repeated operation of freezing is also very injurious to sea-walls, the piers of bridges, and other works exposed alternately to water and frost. An illustration of this fact will be found in the bridges crossing the Thames at Westminster and Blackfriars, as the materials of which they are composed may readily be detached in the winter season, by the slightest external force.

Note.—When we consider that the same agents of decomposition and disintegration, which are carrying waste and ruin, and destruction on those structures of man which are exposed to the ever-changing atmosphere, are like at work among all the mightier monuments of nature, it is difficult to avoid indulging a long train of reflections on the processes of decay which thus seem to visit even the inanimate kingdoms of nature, subjecting all its material elements to continually renewed combinations.

Draining Land.—One of the most obvious sources of advantage to the farmer, from an acquaintance with the distribution of mineral masses, is the facility with which, in many instances, the injurious effect of

small springs coming to the surface, may be prevented. The theory of the earth's internal drainage is so simple, that every man of common sense would be able to drain his lands upon sure principles, or else to know precisely why it cannot be drained, if he were to become so much of a geologist, as to learn what rocks existed under his lands, at what depth, and in what position.

Springs never issue from stratified masses, except from reservoirs somehow produced in jointed rocks, and at the level of the overflow of these subterranean cavities. Faults in the strata very frequently limit these reservoirs, and determine the points of efflux of the water. Let those faults be ascertained, or the edge of the jointed rock be found—the cure of the evil is immediate.

Search for Water.—The same knowledge which guides to a right general method of draining, conducts to a clear and almost certain method of finding water by wells, and enables an engineer to predict, with much probability, whether, at what depth, in what quantity, and even of what quality, water will be found. Why is water so generally found by deep wells at London and Paris? Why is it often so abundant in these wells? Why is it often of pure quality, though, in the descent, small quantities of impure water are frequently penetrated? Because, under both these capitals, the open, jointed, purely calcareous chalk strata, in great thickness, converge with opposite dips, and collect the water, which, upon the perforation of the superincumbent masses of clay, &c., rises with much force and continues to flow, unless drained by other of these wells. This method of obtaining water deserves to be far more extensively practised than it is; because the value of these "Artesian" wells does not lie exclusively in presenting us with good and wholesome water for domestic pusposes; they have been employed in various other ways. In France, their waters are sometimes made the motive power in corn-mills. At Frontes, near Aire, the waters of ten Artesian springs put in motion the wheels of a large mill, and act, besides, upon the bellows and forge-hammer of a nail manufactory. At Tours, a well of nearly one hundred and fifty yards in depth pours two hundred and twenty-five gallons per minute into the troughs of a wheel seven yards in diameter, which is the moving power of an extensive silk manufactory belonging to M. Champoiseau.

The waters of Artesian wells, in consequence of their temperature being, in general, elevated above the mean temperature of the place at which they deliver their waters, have been applied to the very important practical purpose of thawing the ice which impedes the progress of the machinery in winter; insomuch that, by their instrumentality, machinery (such as water-wheels, &c.) which had always been previously clogged by ice for a considerable part of the winter, to the great loss of the owners of the manufactory, were, by the aid of the waters of these fountains, kept constantly free. From the same circumstance, the workshops of M. Bruckmarn, in Wurtemburg, are warmed by the means of water conveyed in pipes from an Artesian spring. There are also greenhouses, whose temperature is kept up by means of the circulation of a constant volume of Artesian waters. At Erfurt, they are used in the formation of artificial beds of cress, which produce £12,000 a year. In the north of France, the reservoirs in which the

flax is steeped, which is destined to be employed in the manufacture of lace and the finer descriptions of linen, are supplied by Artesian springs, whose waters, being remarkably clear, and of an equable temperature, dissolve the vegetable matter with the least injury to the most valuable properties of the plant. In fish-preserves, it is often found that the fish are killed, both by the severity of the winter and the excessive heats of summer; but this effect of the inequality of the seasons has been prevented at the fish ponds of Montmorency, near Paris, by furnishing them abundantly with Artesian waters.

In some of the marshes on the coast of Essex, the want of fresh water in summer was often felt severely; but lately, recourse has heen had to boring, which has been attended with great success—especially in the marshes of St. Oswyth, where the finest springs of water have been found, which flow over the surfuce, and keep ample reservoirs continually full. The depth at which the water was found did not exceed fifty feet. This discovery greatly increases the value of these marshes in dry summers, as that of 1836.

MISCELLANEOUS.

DOMESTIC.

Mammoth Bones on the Kentucky River.—It is stated in the late report of Mr. Stealey, the resident engineer on the Kentucky river, that bones of the mammoth have been found in building every lock and dam on that stream. These bones were dug out of the bank of the river, never less than one hundred feet from the water's edge, and in no case less than fifty feet below the surface of the earth.

Fruits and Valuable Plants of the Oregon.—The March number of Hovey's Magazine of Horticulture contains some account of the vegetable productions of the Oregon Territory, which it might be desirable to introduce on this side of the Rocky Mountains. The following is part of a list of fruits which are spontaneously produced in the valley of the river Oregon:

Solar berry—A sweet and pleasant fruit, of a dark purple color, and about the size of a grape.

Service berry—The fruit is the size of the thorn apple; is black when fully ripe, and pleasantly sweet, like the whortleberry.

Pambina—A species of bush cranberry.

Raspberries—Besides the common kinds, there is a species of three times the size, and of a very delicate and rich yellow color.

Sweet Elder—A variety of that shrub, peculiar to the Oregon region.

Strawberries—Mr. Parker considered the strawberries of the Columbia of a more delicious flavor than any he had ever tasted.

Gooseberries—There are four kinds: Common Purple—bush low, and very thorny; white—fruit small, smooth, and very sweet; yellow—an excellent kind and flavor pleasant, it grows on a shrub free from thorns; deep purple—of the taste and size of our winter grape, with a thorny stalk, fine flavor.

Besides these there are three kinds of currants; the purple, the yellow, and the scarlet. The latter a beautiful fruit resembling the strawberry in sweetness.

Of nutritive roots, there is a bulbous-rooted plant called *Taro*, belonging to the genus *Arum*, which is planted in hills partially flooded with water, like rice grounds. The root is roasted and used as a substitute for bread, or made into *poi* by pulverizing it into a paste. Two kinds of onion grow in the same region, of which one has a beautiful red flower. There is also the *Bitterroot*, a carrot-shaped root, growing in dry land, not particularly pleasant to the taste, but esteemed wholesome by the Indians and hunters. Besides these there are the following:

Wappatoo—Is a bulbous root, the common sagittifolia, or arrowhead, and is found only in the valley of the Columbia river, below the Cascades. It becomes soft by roasting, and is a palatable and nourishing food. It is much used by the Indians, and is an article of trade. It grows in shallow lakes and marshes which are covered with water. The Indians search for it with their feet, and extricating the roots from the mud with their toes, they rise to the surface of the water.

Cammas—Is a truncated root, and is of great importance to the Indians. It grows in moist rich land, in the form of an onion. It is roasted, pounded, and made into loaves, like bread, and has a liquorice taste.

Cowish, or Biscuit root, grows in dry land, and is generally of the size of a walnut, but often larger. It tastes like the sweet potatoe, and is prepared for food in the same manner as the cammas, and is a tolerable substitute for bread.

Of herbaceous plants there is the red-clover, a different species from ours; a kind of wild broomcorn; a wild grain resembling barley; a wild flax, resembling ours, but a perennial plant, the roots of which are large and strong, and which is cut like grass; the indians use it for their fishing nets. There is also the Vining Honeysuckle, which Mr. Parker calls one of the first ornaments of nature, a flowering creeper of extraordinary beauty and vast growth, interlacing the groves like the rigging of a ship with its long and flexible stems. From its fibres the Indians manufacture baskets which hold water.

Of the forest trees, the most remarkable appears to be the Elastic Pine, growing very tall and straight, the wood of which is of very great strength and of elasticity, so great that it is very difficult to break a bough an inch in diameter. It would serve excellently well for masts and spars. Evening Post

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Vegetable, Products and Arts of China.—No climate is so perfectly identical with that of the United States as the climate of the Chinese Empire. It lies, like our country, on the eastern side of a great continent, the configuration of its coast is like ours, stretching from the southwest to the northeast; it lies between the same parallels of latitude; its winters are cold and its summers hot, and as westerly winds prevail most over all the globe, its prevailing winds blow from the interior, as in our own country, and subject the region to great vicissitudes of temperature. Of course the vegetable products of the Chinese Empire, whatever they may be, are perfectly well suited to our own country

in the same latitudes, and such of them as are worth introducing might be cultivated here with a perfect certainty of success.

The March number of Hovey's MAGAZINE OF HORTICULTURE contains a letter from General Dearborn of Massachusetts, in which he indicates several Chinese plants which he supposes might be advantageously introduced here. Among them is the Tallow-tree, or Lat-choo, a large and beautiful tree, with brilliant leaves and pale blue blossoms, yielding an abundance of vegetable wax, for which it is cultivated by the Chinese throughout their country in large plantations. General Dearborn infers that the wax or tallow produced from this tree must be exceedingly cheap, inasmuch as the Chinese use a profusion of candles made from it, all classes of people using lanterns with which they decorate the entrances of their houses.

Transmutation of Plants into others.—We know there appears something altogether contrary to the common laws of propagation in the supposition that one plant may, under any circumstances, give birth to another of apparently different species. We have never said they *could;* but in view of certain facts that have been credibly stated, we have raised the question for consideration. This is the extent of our avouchment of the facts stated by Mr. Smiley in relation to the transmutation of gilliflower tubers into potatoes. The facts, too, stated by Dr. Parker of Billerica, in relation to the product of tiger lilies from an aquatic plant, and of yellow lilies from the peony, we have presented for solution. That wheat in Western New-York has oftentimes turned into chess, is a fact which many intelligent men in that region have testified to. We have once mentioned the alleged fact that barley has been known to produce oats. A few weeks ago we were in Mount Vernon, and on enquiry of a respectable gentleman of that town relative to the crops there, he remarked to us that, somehow or other, he did not know why, the farmers of that town could not raise barley with success. "We sow barley," said he, "and it comes up oats." He gave us several facts in verification of his remark. We could not deny or account for such singularity. Since that time, one of the most respectable physicians in this state, who is himself a skilful cultivator of the soil, has stated to us a fact within his own knowledge, and of which he avers he cannot be mistaken. Some years ago, whilst attending medical lectures at Dartmouth College, Hanover, N. H. he resided in Haverhill in that state. He had occasion to sow a patch of barley. It came up, developed the barley leaf, stock and heads. Whilst the heads were in their infancy, some breachy cattle broke into the plat, and in various places ate down the barley stalks, heads and all. That which was not thus injured ripened barley; but in every case the stalks that had been cropped sent up new stalks in due time, and these stalks, proceeding from the same roots, yielded oats! He says he knows this to be a fact, for it was one within his own personal knowledge, and engaged many of his own and other people's speculations at the time. Maine Cultivator

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The Remains of the Gigantic Mastodon.—While the workmen engaged on section one hundred of the Genesee Valley Canal, a short distance south west from this village, latitude 42 deg. and 12 min. north,

were excavating in a bank some seventeen feet from the surface, they came in contact with the tusk of one of those animals of ancient times the Mastodon or Mammoth. A part of the tusk was all that was obtain ed, owing to the immediate falling of a large portion of earth Those engaged in using the pick-axe at the time not noticing readily the tusk, it was somewhat broken to pieces. The earth where it was found, and for some distance around, is composed of alternate strata or layers of sand and gravel, showing conclusively, the action of water at some far distant period of time. The land over and about where the relic lay embedded, was till very recently covered with a heavy growth of pine and wood timber, and in fact, immediately over where the tusk lay, seventeen feet above, there is the stump of a pine at least three feet in diameter, the growth of five hundred years. Hinsdale Gazette.

Geological Remains in the West.—We have had the pleasure of a conversation with one of the most intelligent gentlemen of the West, upon some of the most striking of the ancient remains of Missouri, and Wisconsin. Most of what he informs us he had actually seen and examined for himself, with all the facts and history of curious remains either of men or animals in the West. We thought it would not be uninteresting to describe, in brief terms, some of these remains, especially as we have been rather sceptical in respect to some of the accounts.

1st. The Missourian, or the vast and unknown animal recently discovered in Missouri. This he has seen and examined. The man who discovered this animal did it in consequence of an Indian tradition, which said at that place there was buried a great animal, and whose remains they were anxious to protect and and to keep the whites off. On digging, the remains were found as described. With them were also found arrow heads of much larger than the usual size. The animal is put together and is of vast size. A band of music is seated between his ribs, and at a height of ten or twelve feet; his length is twenty or thirty feet, and he belongs without doubt to the amphibious class. His tusks are of an enormous size, and notwithstanding they are curved in and partly broken, measure fifteen feet from tip to tip. The most singular part of his formation is, that the joint of his hind leg turns outwards. This creature is as much larger than the mammoth as the latter than an ox.

2d. It is a fact that on one of the highest hills of Missouri, are found a great quantity of the mammoth bones of skeletons, indicating that at the deluge or some other great flood, these animals had retreated to the tops of the hills, and there perished.

3d. The Petrified Forest. Of this we had some doubt, but of the general fact there is no question. Over a considerable space of ground, parts of the trunks of trees and fragments of limbs are found perfectly petrified.

4th. The City of Azetlan, which a year or two since was announced as existing on one of the branches of Rock River, in Wisconsin, is a reality, so far as relates to the extensive remains of ancient works. Our informant examined this work thoroughly. It consists of parapets of earth, like the Indian Fortifications of Ohio, with some things peculiar to itself, covering thirteen acres of ground. No evidences of a higher

civilization than that which exists in the Ohio works was found, except it may be some brick burnt in the ancient rude way. These were found in certain projections from the parapets. They were evidently brick, but made with straw in the old mode, and rudely formed. It is said, however, that the Indians of the Rocky Mountains do now make brick.

Within two of the angles of this work are found two towers and mound, intended, as our informant believes, for watch towers, and also burial places. Through one he dug but found nothing. In the other he found a regular vault about the size of a common room, but much longer one way than the other. Here he found many bones of human beings. It was evidently a tomb. He says that the Indians of the far north west say that they have seen the common Indian mound built, and that the process is, first an illustrious chief is buried, and that in mark of their respect, others as they go by deposit some additional earth, and thus the mounds grow to their present size.

There is undoubtedly, much evidence to show a more civilized race once inhabited North America; but on tracing out the links of that evidence there is one yet wanting. The ancient remains in the west have not yet shown evidence of arts or science superior to what the Indians of this day might have had.

The existence, however, of these remains, and even of the people themselves, still involves an inscrutable problem; a problem upon which the forth-coming work of Mr. Stevens may throw some light.

In the Clinton Republican (Wilmington) we find an article on the geology of the Miami country, which has much interest. The writer is speaking of the geological remains on Todd's Fork on the Little Miami. After speaking of fragments of primitive rocks, still found in this region, the writer proceeds to say :—

" In digging wells and excavating the earth near Wilmington, beds of *Peat* have been discovered at the depth of twenty feet from the surface, and charred wood and parts of vegetables at a much greater depth, furnishing indubitable evidence that the superincumbent soil has been made by the convulsions of the elements in that great change produced in the order of things by the deluge. The country through which Todd's Fork runs, is formed from the diluvial deposit, but in many places the alluvium is collected in peat beds, and furnishes the richest and most productive bottom lands in Ohio. Minerals are buried far beneath the surface, and the land is much better adapted for farming than for mining.

Along the banks of Todd's Fork northwest, and west of Wilmington, may be found the human skeleton deposited in stony vaults, made of flat limestone. These stony graves are built on elevated ground, and bear evidence that the design in their construction was to exclude water from entering. The earth does not seem to have been excavated to deposit the dead, but their their tombs are built on a level with the earth's surface. Comparing a human skull taken from one of these stone arches with one taken from a mound that had been near ten feet over the skeleton, it seems that the changes that have been wrought on them by time, are very similar. The skull taken from these rocky tombs presents to the eye the appearance of bone that has been calcined

by slow and continued heat, dissipating the fibre and gelatine, and leaving nothing to preserve the identity of the human form but the phosphate of lime. It has been supposed by those who have examined the contents of the mounds that are found in various places between the Scioto and Miami rivers, that they have been the depositories of human remains for many ages." Cincinnati Chronicle.

Fog Bell.—The following is the description of the fog bell, recently erected near White Head, at the entrance of Penobscot Bay, Maine.

"The power which rings the bell is obtained by the rise and fall of the tide and the "swells," which at that place are constant and unceasing. One end of a large stick of timber, near thirty feet in length, projects out upon the water, the other end being confined by braces and chains to the middle of another stout timber, some twenty feet long, which lies along the shore, hinged at each end to a projecting rock; both together forming a T. From this point of junction a small timber rises vertically, to the height of eighteen or twenty feet, being well braced to this position; to the upper part of the mast is attached a chain, which, with a continuous rod of iron, extends up to the bell-house, a distance of about one hundred and forty feet. This chain receives from the vibrations at the outer end of the log of timber, and a "take up weight" in the bell-house, a constant reciprocating motion, which acting on the machinery in the bell-house, winds up the heavy weights of about two thousand pounds, that drives both the regulating and striking part of the apparatus. The peculiar arrangement of wheels, &c. called the "maintaining power," which enables the weight to perform these two offices at the same time, without either interfering with the operation of the other, is an ingenious invention, yet quite simple, and not likely to get out of order. Ordinarily the action of the float greatly exceeds what is required to wind up the weight; and there is an arrangement by which, when the weight is wound up, the connecting wheels are thrown out of gear, leaving the float to act without effect, until the weight descends to a certain point, when the connection is formed again. The bell is struck four times a minute, by hammers weighing about fifteen pounds, and the blow appears to be as heavy as the bell will bear with safety. The force of the blow may be increased or diminished at pleasure."

FOREIGN.

Wonderful Artesian Well.—At last, after *seven years* assiduous toil and boring to the depth of 1700 feet! on the 26th February, *M. Mulot*, the engineer, who had persevered against all discouragements in the enterprize, was rewarded, at the moment of withdrawing the iron rod, (as thick as an ordinary axle-tree,) with a copious gush of warm water. At the sight of it he exclaimed, not unlike the Greeks under Xenophon, on reaching the sea, "Water! water!" and in his working clothes rushed to the Town Hall, where the municipality were in session, and bursting into their midst, repeated "Water, water!" and they in turn cried "Huzza for *Mulot!*"

The site of this remarkable well, which continued to pour forth a full and constant stream, was at the public slaughter house, near the barrier of *Grenelle*. Mulot was honored with a decoration in consequence of his success. He is to be employed in piercing three other such wells.

Crowds of curious persons had continued to visit the wonder, all carrying away in vials and bottles portions of water, and some shaving themselves in public with the warm fluid. Ministers had also visited it. The water will, it is supposed, suffice for the supply of the neighborhood of Chaillot, of the Military School, and the Invalides. Warm baths for the accommodation of the people are to be constructed and supplied from this source.

Effect of Climate on the Human Form.—The human form is affected by climate, like plants: it is developed more early in the sunny south than in the frozen north; the imitative arts are also more easily acquired, and the faculties unfold earlier; but children born in the north have firmer and more staged habits, attain greater combinations of thought, and think more profoundly.

Railways.—In the Newcastle collieries, wooden railways were used in the 17th century, and for which, on a limited scale, iron began in 1767 to be substituted, as a more durable material. This experiment met with so little encouragement, that, thirty years after, a Mr. Carr published a book, claiming to be the first inventor of cast-iron rails. These railways, it may be remarked, were all private undertakings; no public railway was attempted. The first act of Parliament for a work of this kind was passed in 1801, and was for the construction of a railway in the vicinity of London, from Wandsworth to Croydon. In the 23 years that followed only 21 acts were passed for railways, showing the little alacrity with which the new power was brought into use. Railways, for nearly two centuries after their introduction, were considered only as a means of economizing—not superseding—animal labor. So early as 1759, the idea of applying steam power for propelling carriages was thrown out by Dr. Robinson, of Glasgow; and, in 1784, Watt, in the specification of one of his patents, stated that it was intended to use his steam-engine for the same purpose; but neither of these philosophers made any effort for reducing their suggestions to practice. In 1787, Mr. Symington exhibited the model of a steam carriage in Edinburgh; but it was not until 1804, that Trevithick invented and brought into use a machine of this kind upon the railroad of Merthyr Tydvil in Wales. It is a singular fact in the early history of locomotive carriages, that the projectors assumed the existence of a difficulty which is now known to be wholly imaginary; this was, that the adhesion of the smooth wheels of the carriage upon the equally smooth iron rail must necessarily be so slight, that if it should be attempted to drag any considerable weight, the wheels might indeed be driven round, but that the carriage would fail to advance, because of the continued slipping of the wheels; and several remedies were devised for this fancied counteraction. The honor of discovering this oversight is due to Mr. Blackett; but the idea of a want of adhesion had taken such firm hold

of the public mind, that it was not generally removed till the opening, in 1830, of the Liverpool and Manchester Railway. A second misconception in the history of these inventions deserves to be recorded. It is a fact, that of all the railways constructed and contemplated, up to the opening of the Liverpool and Manchester line, not one was undertaken with a view to the conveyance of passengers; on the contrary, steam vessels were originally projected for the conveyance, in rivers or coastwise, of passengers only; and they were not employed in this kingdom for the transport of merchandise before the year 1820. Wade's British Hist.

Art of Lithography.—The principle of the art, in the first place, is based upon chemical affinity. The impression (unlike an engraving on copper or wood) is obtained from a flat surface. The stones used are either grained or polished. The grained stone is prepared by wetting the surface of the stone, and, through a fine wire sieve, sifting some sand on the face or surface of the stone. Another stone is then taken with the smooth surface downwards, and laid upon the one which has received the sand, and both are rubbed together with a circular motion, to produce the requisite grain. The stones, when thus prepared, are used for drawing as with a pencil and paper. The lithographic chalk is made of tallow, wax, soap and lamp-black to color it. The polished stones required for writing imitations of pen-and-ink sketches, are prepared by rubbing the stone with pumice stone and water. The process, as an example, is to draw a given subject with the chalk above mentioned upon the grained stone; a solution of nitrous acid is then poured over the stone, which unites with and nullifies the soap in the chalk or pencil, and renders it insoluble in water. The stone is then handed over to the printer, who, in the first instance, washes the surface of the stone equally with a sponge and water—the drawing, by reason of the grease, remaining on the stone. A roller, covered with common printer's ink, is then passed over the stone, which is not even soiled, because one part (the drawing) is greasy and the other wet; the ink thus passes to the drawing only. Damp paper is then put over it, and the whole is placed in a press which runs over the stone; the drawing passes from the stone to the paper, and thus a great quantity of impressions are taken. Cor. of Mech. & Chem.

Lacquer to imitate Gilding.—Take eight ounces of amber and two ounces of gum-lac, melt them in separate vessels, and mix them well together; then add half a pound of drying linseed oil; into a pint vial put half a pint of spirit of turpentine, and digest in it a little saffron; when the color is extracted, strain the liquor, and add gum tragacanth and annotta, finely powdered, and in small quantities at a time, till the required tone of color is produced; then mix this coloring matter with the above ingredients, and shake them well together, till a perfect union takes place. If this varnish be laid over silver leaf or tinfoil, it will be difficult to distinguish it by the eye from gold.

New mode of reducing Silver Ores.—In the present ordinary mode of conducting the process of extracting silver from ores, they are melted in a reverberatory or other furnace; when melted, the furnace is tapped

and the fluid metal run out into tanks of water. When cooled, the metal is collected, returned into the furnace, and remelted, when a proper quantity of lead is added to it in aid of the subsequent process of separation. In consequence of the very high temperature of the furnace employed to effect the fusion of the silver, a very large portion of the lead is destroyed and lost, and to obviate this waste is the object of the improvements constituting this invention. The new mode is as follows: The silver ores or other matters are melted in the usual manner; but instead of being run off into water, a bath of melted lead is provided, into which the melted mass of ores, &c. are run in thin shallow streams so as to bring as large a surface as possible in contact with the lead. The quantities recommended to be employed are thirty tons of lead to one ton of the ores: the tapping of the furnace is to be so regulated as only to run about 300 weight of ore into one lead bath.

Zincing Copper and Brass.—M. Boettiger has succeeded in covering plates and wires of copper, brass, pins, &c. with a brilliant coating of zinc. His method is as follows:—Granulated zinc is prepared by pouring the fused metal into a heated iron mortar, and stirring it rapidly with the pestle until it is solidified. The metal thus granulated is placed in a porcelain capsule, or in some other non-metallic vessel. A saturated solution of sal-ammoniac is poured over it; the mixture is boiled; the objects to be rendered white are now placed in it, previously dipped in dilute hydrochloric acid: in a few minutes they are covered with a brilliant coating of zinc, which it is very difficult to remove by friction. The galvanic action is thus explained: The double chloride of zinc and ammonium formed is decomposed by the zinc and the plate of copper; the chlorine disengaged from the sal-ammoniac goes to the zinc; the ammonium is disengaged in the form of gas, and the undecomposed sal-ammoniac combines with the chloride of zinc to form the double chloride, a very soluble and easily decomposed salt. If then an excess of zinc exists in the solution in contact with the electro-negative copper, the salt is decomposed into its elements, and the reduced zinc is deposited on the negative copper. Atheneum.

New Shoe for Horses.—A Frenchman of the name of Jony, who is at present resident in Poland, has invented a new method of shoeing horses, for which the emperor has awarded him 50,000 roubles, besides an exclusive patent. Jony covers the entire hoof with iron, and the base of his shoe, or as it is called, sandal, is perfectly smooth. This method of his is being adopted in all parts of Russia. It requires neither nail nor screw; it is extremely cheap; and has the important characteristic of great lightness. Horses whose hoofs have been destroyed by bad shoeing, are by the use of these "hippo-sandals," restored in a short time to their former state of efficiency, and may be used as soon as they are provided with them. Some horses have been brought to Mr. Jony's smithy, which could scarcely limp along, and with their hoofs in so lamentable a state that the common mode of shoeing could not have been applied to them; but after performing a slight operation upon them, and putting the new sandal on their feet, they were sent back to their owners in a comparatively sound state and fit for work. U. Ser. Jour.

Improvements in Soap Making.—These improvements, the invention of Mr. John Lambert, Coventry-street, Westminster, consist in the production of a cheap paste to be advantageously employed for mixing with soap. This paste is produced in the following manner:—Bones, being first cleansed with sulphuric acid, are to be broken into small pieces and packed closely in a suitable vessel; they are then covered with caustic alkaline ley, or leys of crystals of soda, spec. grav. 1.120 to 1.140, water being 1.000. After standing for two or three weeks, these materials will be reduced to the consistence of kitchen stuff; it is then passed between three pair of rollers placed over each other, having suitable hoppers. One roller in each pair turns faster than the other, which gives friction as well as pressure to any substance between them. After the paste has passed through these rollers, it is heated by steam, when it is in a fit state for admixture with the soap; this should be done when the soap is ready for framing: the paste should be well stirred in, that the two substances be thoroughly incorporated, when the soap may be framed in the usual manner. The paste will be improved by adding tallow and alkaline, each 10 lbs. to every 100 lbs. of paste. Should the paste be too thin, it must be solidified by continuing the heat and evaporating the superabundant moisture; if too thick, it may be thinned by caustic alkaline leys. The quantity of paste used will depend upon the quality of soap desired; a common soap may be made with two-thirds of paste to one-third of soap.

Interesting to Botanists.—At a late meeting of the Horticultural Society, a letter was read from Sir C. Lemon, giving an account of flowering the *Rhododendron arboreum* at an unusual season. Last November, when pruning the plants, he caused some branches with unripe capsules and blossom buds to be stuck in the mud of a tank in a stove; the cuttings with capsules soon produced a shoot about five inches long, and ripened the seeds; those bearing a flower bud expanded the blossoms beautifully about a fortnight after being placed in the tank. A paper by Mr. Fortune was read, describing the results of some experiments made on growing plants in frames and houses built of kyanized wood, from which it appears that kyanized wood is highly injurious to vegetation in a warm moist atmosphere; it ought only to be used when well painted over and placed in a low temperature, with little moisture.

Atheneum.

Stammering.—The German papers mention a discovery of Professor Diefenbach, which is exciting general attention at Berlin. He has discovered a method for the cure of stammering, by an incision in the tongue—which is said to have been in all the instances where he has operated completely successful. According to the Professor, stammering proceeds from the difficulty of applying the tongue to the roof of the mouth, and his remedy consists in the removal of the impediment.

A New Light.—A new mode of obtaining light has recently formed the subject of a course of lectures at the Polytechnic Institution. The discovery has been patented by its ingenious inventor, who has rendered it applicable to table and other lamps, which are thus made to consume wax or tallow in the same manner as oil. The candle (for such it is)

is made without a wick, and has a hole running completely through it. The wick being attached to an adjustible rod, allows of the light being regulated or extinguished altogether. The light obtained is very powerful, and four times stronger than a mould candle of the same dimensions, the effect being greatly promoted by the principle of feeding the flame with atmospheric air from below the wick. This useful novelty is termed the Soho Lamp.

Singularly destructive Projectile.—An extraordinary experiment, of which the following is a sketch, took place yesterday week, in the grounds of Mr. Boyd, in the county of Essex, a few miles from town, in the presence of Sir Robert Peel, Sir George Murray, Sir Henry Hardinge, Sir Francis Burdett, Lord Ingestre, Col. Gurwood, Captains Britten and Webster, and some other gentlemen. A boat, 23 feet long and 7 broad, filled in with solid timber 4½ feet in depth, crossed in every direction, and clamped together with eight-inch spike nails, was placed in a large sheet of water; at a given signal set in motion, and struck just abaft the starboard bow, when she instantaneously scattered into a thousand fragments. At the moment of collision, the water parted and presented the appearance of a huge bowl, while upon its troubled surface there was a corruscation resembling forked lightning; a column of water was lifted into the air like a huge fountain, and from it were projected the shattered fragments of the vessel, many of which fell in the adjacent fields, and at a distance of several hundred yards; the huge nails had snapped like carrots, and the mast looked like a tree riven by lightning. The noise of the explosion scarcely exceeded that of a gun, and this has been much modified by the inventor. The invention, which has been the discovery of one man, far outstrips that of the magian and Greek fires, and is more under control than gunpowder.

The secret by which this mighty effect was produced was known to two naval officers present, and the inventor offered to go into details confidentially with one or two of his distinguished visitors. He stated to Sir Henry Hardinge, that without a battering train, he could transport, on a mule's back, the means of destroying the strongest fortress in Europe—a startling assertion, but, after what he had performed, it would be unjust to say that it was impossible. The inventor asserted that these tremendous powers were completely under his control; that the instrument that had thus lifted into the air a boat weighing two and a half tons, and filled in with solid timber weighing five and a half tons, besides displacing about fifteen tons of water, weighed only eighteen pounds, and might, without danger, be kicked round a room when charged with its deadly contents. Its security and portability are also points of vast importance, when it is recollected how many accidents occur daily from the detonating shells now in use. At Acre, most of those employed burst before they reached their object; and they are liable to explode when rolling about a ship's deck, and dangerous to carry in a common ammunition cart on a rough road. The step of the mast, which is in the possession of Sir Robert Peel, is worthy of attention: it has been split up hollow like a bamboo; no appearance of scorching is perceptible; and the mast is not only shivered longitudinally, but divided across in several places. London Times.

Head of the Laocoon.—The following statement has appeared in the French papers, and is professedly contained in a letter from M. Valmore, an artist at Brussels:—"In the Gallery of the Duke d'Aremberg there are many things which are not known to any but the initiated. Among them is *the original head of the Laocoon.* This fine group, when first discovered in Italy, was (as is generally known) without the head of the father and an arm of one of the sons. The head was supplied by a celebrated artist, who copied it from an antique bas-relief. Some time afterwards, the original was found by some Venetian connoisseurs, and was ultimately sold to the grandfather of the Prince for about 160,000 francs, and brought to Brussels. When Napoleon, during the Consulate, had the group transported into France, he knew that the real head was in possession of the Duke, and offered him its weight in gold for it. This was refused; and as it was known that Napoleon was not scrupulous in gratifying his desires, the Duke d'Aremberg sent this *chef-d'œuvre* to Dresden, where it remained concealed for ten years, but was brought back again into Brussels, when Belgium became tranquil. It expresses, in the highest and most admirable degree, moral grief mingled with physical pain. The compression of the teeth and contraction of the lower jaw are almost too horrifying to be long contemplated; and yet in this intense expression of suffering there is not the slightest grimace. The pupils of the eyes are so exquisitely executed, that they actually seem to flash from the marble (!) A cast from the head now on the statue is placed by the side of the original, and the vast difference between the two is at once evident."

Percussion Shell.—The following description of a percussion shell, to explode at the bottom of the sea, was read at a late meeting of the Royal Society, by Capt. J. Norton:—

An iron tube, like the barrel of a musket, is screwed into a shell of any size, water tight. A rod of iron, about half a pound in weight and a foot in length, is suspended within the tube, by means of a split quill passing through a hole in the upper end of the rod, the other end being armed with a percussion cap. The mouth of the tube is closed with a screw lid, also water tight. Tin or brass wings being attached to the upper end of the tube, will keep it in a vertical position during its descent to the bottom of the sea; and the shock on its striking the bottom will cause the bar of iron within the tube to fall, and produce the percussion and explosion. Should it be found difficult to make the shell water-proof, I am satisfied that percussion powder made from silver will explode by friction or percussion even when *mixed with water.*

Metallic Relief Engraving.—A correspondent of the Atheneum announces the two following embryo methods of engraving:—

1. Take a tablet of plaster of paris, and, having heated it, apply wax for absorption to all the faces save that on which you intend your drawing to be, and to that one apply your drawing, executed with lithographic ink, on lithographic transfer paper. Let the side of the tablet on which is the transferred drawing be now dipped in weak acid and water, and then permitted to absorb a solution of sulphate of copper. By electro-metallurgy a deposition of copper can be made on all parts

stained with the sulphate. Ere this coating be too thick, let the tablet be removed from the vessel in which this last operation has been carried on, washed *carefully*, dried, and a mixture of isinglass and gin be poured on it; its redundancy be gently blotted off with blotting paper till the surface be level (*i. e.* the copper lines and isinglass cement be of the same height): again, let the deposition take place, and again its succeeding operation; after which let common black lead be rubbed over the whole surface; and the deposition being renewed, a copper mould, from which a type metal block may be subsequently cast, is now formed.

2. Draw with a pen dipped in warm isinglass colored cement, and when your drawing be dry, for an instant expose it to steam, and then coat it with leaf gold. Proceed by electro-metallurgy, as in last method, and no cast is necessary.

Artesian Wells in the Oasis of Thebes.—M. Ayme, a French chemical manufacturer, has been nominated by the Viceroy of Egypt civil and military governor of the whole of the Oasis. This Oasis is 23 leagues in length, and from two to four in breadth. That of Garbe, where there is also an alum manufacture, is about 20 leagues in extent. These two oases contain, it is said, some excellent soil, calculated for raising indigo, cotton, sugar, and madder; they are studded with artesian wells, which have been noticed by Arago. The ancient inhabitants used to dig square wells through the superficial vegetable soil, clay, marl, and marly clay, down to the limestone, from 20 to 25 metres in depth. The last rock contains the water which supplies the wells, and is called by the Arabs *Agar el moya.* In the rock, holes were bored from four to eight inches in diameter. These holes were fitted with a block of sandstone supplied with an iron ring, in order to stop the supply, when there was danger of inundating the country.

DESCRIPTION OF AMERICAN PATENTS

Granted from Jan. 9th to Feb. 3d, 1841.

Improvement in Machines for cutting Rawhides and Leather into strips for the manufacture of Ropes, &c. By Philip B. Holmes and Wm. Pedrick, Charlestown, Mass. Jan. 9th.

Claim.—We shall claim as our invention, reducing or cutting hides or other similar materials, into long bands or strips, by means of a revolving table, in combination with a circular or other proper shaped cutting knife, attached to a movable carriage over the same; said knife being caused to pass from the circumference towards the centre of said table, by the action of a revolving screw or other similar apparatus, so as to describe a spiral or curved cut through the hide on said table, as the same revolves; the whole being arranged and operating together substantially in the manner as herein above described and set forth.

We also claim supporting the periphery of the hide above the revolving table, while the circular knife operates thereon, by means of a plat-

form, attached to the knife frame, through an elongated slot in which platform the knife is inserted, and acts on the hide resting on the same; the whole being arranged and operating substantially as herein described.

Improvement in Springs for Railroad Cars, Locomotives, and other Vehicles. By WILLIAM DUFF, Baltimore, Md. Jan. 9th.

CLAIM.—What I claim therein, and desire to secure by letters patent, is the manner in which I have combined the steel plate spring, as constructed with scrolled ends, or with the ends attached to vibrating bars, or to be received into pockets, with the spiral springs, which are so graduated in length as to be successively brought into action according to the bearing of the load, as herein described.

Improvement in the mode of operating Valves of Steam-Engines. By JOHN WILDER, New-York. Jan. 9th.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the combination of the lifting rod *a e*, principal lever *a b c*, and the second lever *e d*, with the eduction valve *l*: the whole being constructed, combined and operating substantially in the manner set forth.

Improvement in Hydrauiic Wheels for Raising Water. By PIERRE DESIRE HENRY, New Orleans, La. Jan. 9th.

CLAIM.—What I claim as my invention, and desire to secure by letters patent: the tangential manner in which I arrange the tubes for conducting the water to the gutter, in combination with the valves governing inlet of the tubes; also, in combination therewith, the spoons for scooping the water up when the basin is low in the said hydraulic wheel, for draining or raising water.

Improvements in Cars for Rail and other Roads. By JOHN A. WHITFORD, Saratoga Springs, N. Y. Jan. 20th.

CLAIM.—What I claim as my invention, and which I desire to secure by letters patent, is—

1. The combination and arrangement of the pinions K, cogged bars M, arms L, segments P, chains Q, and windlasses R, for turning and guiding the cars, as described.

2. The mode of coupling the divided axle E, by means of the tube V, in combination with the mode of adjusting the same by means of the screws, ratchet wheels, pawls and slides, as described.

3. The arrangement of the springs F, in combination with the bolts *t* and spring *s*, as described.

Improvement in the mode of driving light Machinery with the Foot. By AARON CLARKE, Greenwich, Ct. Jan. 20th.

CLAIM.—But what I do claim as my invention, and desire to secure by letters patent, is the combination of the pin on the horizontal wheel, the oval board having a socket in it for the pin to work in, and the shoe attached to the oval board to receive the foot of the operator, as herein described.

Improvement in the construction of the Argand Lamp. By BENJAMIN HEMMENWAY, Norfolk, Mass. Jan. 20th.

CLAIM.—I claim combining with the air chamber B, in the manner set forth, a tube K, for admitting air to said chamber, and a stationary fountain or reservoir for containing oil, constructed as described; that is, having a tube to admit of a supply of oil when necessary, with a cap adapted to said tube to exclude the pressure of the air, and a tube F for conveying the oil to the chamber B, provided with a stop-cock to intercept the communication while the fountain is being filled, all as set forth.

Improvement in the Machine for Sawing Shingles. By TRUMAN WALCOTT, Stow, Mass. Jan. 20th. [Antedated Sept. 5th, 1840.]

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the combination of the ratchet wheel, shippers, and tooth guages, for the purpose and in the manner specified.

Improvement in the Seed Drill or Corn Planter. By CALVIN OLDS, Marlborough, Vt. Jan. 20th.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, consists in the arrangement of the cup wheel on the axle of the large wheel E, so as to render it adjustible, as before described.

Portable Safety Barge and Army Boat. By SOLOMON C. BATCHELOR, Cincinnati, Ohio. Jan. 20th.

CLAIM.—What I claim therein as constituting my invention, and desire to secure by letters patent, is the manner in which I have arranged and combined the pieces of timber forming the ribs, the cross-pieces, by which their ends are sustained, and the longitudinal pieces constituting the keel, and the upper timber *e e*; the respective parts being united by joint pins, hinge joints, and rule joints, substantially as herein set forth, so that the whole, when not in use, may be folded together, and be instantly prepared for use by the mere act of unfolding or opening.

Improvement in the manner of constructing Railroad Car Bodies. By GEORGE S. HACKER, Charleston, S. C. Jan. 21st.

CLAIM.—But what I do claim as my invention, and desire to secure by letters patent, is the construction of the body of a railroad car in the form of a barrel, hooped, in the manner and for the purpose specified.

Improvement in the Door-Spring. By SAMUEL SAWYER, Boston, Mass. Jan. 21st.

CLAIM.—I shall claim, constructing the same with a turning shaft or pin C, connected to and operated by a spring A, applied to the door, in the manner above mentioned; said shaft C having an arm G projecting therefrom, and jointed at one end to the extremity of a bar H, the said bar H at its other end being connected to the door-frame by a suitable joint or pin K, on which it may turn; the whole being arranged and operating substantially as herein above set forth.

Method of manufacturing Balls (such as Boys use in their Games) from Caoutchouc or India Rubber. By CHARLES B. ROGERS and EDWARD ARNOLD, assignees of EDWIN M. CHAFFEE, Charlestown, Mass. Jan. 7.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the making of balls from caoutchouc, by chopping it fine, or otherwise properly reducing it to small pieces, and separating and heating the same by throwing it into hot water, and afterwards pressing it in a mould constructed as above described, the whole process being conducted substantially as herein set forth.

Improvement in the method of manufacturing Corsets to be worn by Females during Pregnancy, or suffering under Umbilical Hernia or abdominal weakness. By ELIZABETH ADAMS, Boston, Mass. Jan. 21st.

CLAIM.—I claim the combination in a corset, constructed as described, so as to be loose between the breast and abdomen, of the front slits or openings, *hh*, *ii*, *kk*, *ll*, fig. 2, (laced with caoutchouc or other suitable elastic cord or strings) with the steel busk or spring *a a a*, curved and shaped as described and represented in the drawings, so that while the said busk, in conjunction with the curved form, which it imparts to the bottom of the corset, serve to support the distended parts, the several slits in *front* allow the parts as they enlarge to expand outwards or horizontally, and the looseness of the corset above the abdomen permits them to rise upwards when sitting or stooping, by this arrangement effectually removing any liability of an inconvenient or injurious pressure upon the abdomen, as it protrudes or increases in size.

Method of manufacturing or forming Ice. By THOMAS B. SMITH, St. Louis, Mo. Jan. 23d.

CLAIM.—What I claim therein, and desire to secure by letters patent, is the manner herein described of rapidly forming thick sheets or blocks of ice, by the successive pouring of small portions of water into a vat or other suitable vessel, allowing the same to freeze, and adding in succession fresh portions of water, as above set forth, until the process is completed.

Improvement in the method of moving the Index (through a semicircle) on a Weighing Apparatus. By MARTIN ROBBINS, Hollidaysburg, Pa. Jan. 23d

CLAIM.—What I claim as my invention, and which I desire to secure by letters patent, consists in the arrangement of the small wheel G, in combination with the chain F, and lever weight B, for causing the index H, to perform a semicircle on the graduated arch for indicating the weight of the article to be weighed, as before described.

Improvement in the manner of constructing the apparatus called "the Fire Escape," and also to aid in extinguishing Fires in Buildings. By SAMUEL WELSH and THOMAS LINACREE, Albany, N.Y. Jan. 9th.

CLAIM.—We confine our claim to invention, therefore, to the particular manner of combining those parts thereof, by which it is held steadily when the shaft is being raised, and whilst it is in a vertical position;

said combination consisting of the adjustible leveling bars G G, the movable braces E E, and the scotch blocks F F, coöperating with each other in the manner set forth. We also claim the combining with such apparatus, the trough and ladder, as shown in fig. 3, with the additional pulley for elevating and managing the same.

Improvement in the manner of taking Measure and Draughting for the cutting out of Ladies' Dresses, including Habits, Cloaks, and other similar articles. By AARON A. TEUTLER, Philadelphia, Pa. Jan. 23d.

CLAIM.—What I claim as constituting these improvements, and desire to secure by letters patent, are the following particulars:

1. I claim the applying of the measure of the half girth of the body, taken in the manner herein pointed out, to the draughting of the sleeve, by the aid of the lines of punctures or perforations, E, F, and G, laid down on the foundation, fig. 3, of the accompanying draughts, in the manner or upon the principle herein made known.

2. I claim the manner of draughting for the cutting of capes, yokes, and collars, by using the fronts and backs, obtained and employed in the manner set forth, as a guide in striking the curves thereof, and in determining the outlines of their front and back edges, as set forth.

Improvement in the process of manufacturing Sulphate of Alumine. By RUDOLPH BONINGER and GUSTAVA BONINGER, assignees of MAX. JOSEPH FUNOKE, Baltimore, Md. Jan. 23d.

CLAIM.—I claim in combination, the preparing of the clay by desiccation, the combining thereof with sulphuric acid, and the subsequent solution and precipitation of the iron, substantially in the manner and for the purpose herein fully made known.

Improvement in the construction of the "Corn-Sheller." By JOHN A. WHITFORD, Saratoga Springs, N. Y. Jan. 23d.

CLAIM.—What I claim as my invention, and which I desire to secure by letters patent, is arranging the lower sheller P, in the lower part of the concave T, so that they shall yield together, to the different sized ears, in the manner described; and this I also claim in combination with the upper sheller H, and comb S, in the manner and for the purpose specified.

Improvement in the method of constructing the Brick Press. By THOS. CONKLIN, Woodville, Miss. Jan. 23d.

CLAIM.—What I claim as my invention, and which I desire to secure by letters patent, is the before described arrangement of the endless chains to which the moulds are attached, and the way, guides and inclined planes, in combination with the circular revolving platform, the mixing tub, inclined discharges therein, pressers, striker and discharger for making bricks in the manner herein set forth; there being a continuous line of empty moulds made to pass under the discharging aperture in the bottom of the mixing tub, whilst at the same time a similar line of filled moulds are made to leave the aforesaid aperture, pressed, struck, scraped, and the moulds liberated from the chains by the inclined plane

at the end of the way, and in combination therewith the endless chain for supplying the clay, as described.

Improvement in the machine for Heading Spikes. By ROBERT S. HARRIS, Wilmington, Delaware. Jan. 25th.

CLAIM.—What I claim as my invention, and wish to secure by letters patent, is the combination of the jaw A, toggle joint D, and spring Q, for the purpose of throwing open the jaw as described, and these parts thus combined, I claim also in combination, with the treadle B, rest or support C, and pin E, with their connections, for the purpose and in the manner specified.

Improvement in the method of constructing Valves or Dampers in Chimney Flues. By NORMAN SMITH, Hartford, Ct. Jan. 25th.

CLAIM.—What I do claim as my invention, and desire to secure by letters patent, is the peculiar manner in which I have applied dampers or valves, so that they can be removed at pleasure, without removing any of the fixtures to which or by which they are attached, by having the pivots of the valves drop into notches made in the iron framing, which is attached or let into the throat or flue of the chimney, in which they are retained by the weight of the iron valves, but from which they can be removed for the purpose and in the manner specified.

Improvement in the method of working the Steam Valves of Steam Engines, when the Steam is cut off and allowed to act expansively. By ROBERT L. and FRANCIS B. STEVENS, New-York. Jan. 25th.

CLAIM.—What we claim as our invention, is the combination of an additional and separate eccentric wheel, to work a rock shaft to raise the steam valves, in combination with any of the several methods hitherto used for working the exhaust valves. We also claim the manner in which the toes are affixed to the rock shaft, so that the shaft is made to vibrate during a certain interval without either toe communicating motion to either valve. We also claim the combination of the cog wheel and rack, in the manner set forth, for the more completely effecting our object.

Improvement in the method of constructing the "Corn-Sheller," where a Desk is used, by adapting an adjustible Plate thereto, to regulate the feeding. By CHARLES WILLIS, Chelsea, Mass. Jan. 27th.

CLAIM.—I shall claim therein the movable plates, placed in the rear of the holding spouts, and capable of being adjusted by screws, to such distances from the teeth of the rotary circular plate as may be desirable; the whole being arranged and operating substantially as herein above set forth.

Improvement in the Barometer for ascertaining the rise and fall of the mercury in the tube by the difference of weight. By WM. R. HOPKINS, Geneva, N. Y. Jan. 27th.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the method of ascertaining the height of the mercury in the

barometer tube, by weighing the quantity remaining in the reservoir or cistern of the barometer. I also claim the sack *i j*, and valve *v*, in combination with the barometer tube, by means of which the flow of mercury can at any time be arrested for the purpose of weighing.

Improvement in the manner of forming Blocks of Wood intended to be used for the Paving of Streets and Roads in general. By JAMES H. PATTERSON, New-York. Jan. 27th.

CLAIM.—What I claim therein as constituting my invention, and desire to secure by letters patent, is the cutting of such blocks on two of their sides, so that they shall have four or more rectangular faces, with rectangular offsets, as here described, when said blocks are intended to support each other in a straight line only, crossing the road or street. And as it will be manifest that the principle upon which I shape my blocks may be carried out by forming a greater number of rectangular faces and offsets, I do not intend to limit myself in this particular; but I am confidently of opinion that any change in these particulars would only render the plan of construction more complex, without being productive of any advantage.

Improvement in the Domestic Spinner for spinning Wool. By JOHN NELSON, Jefferson, Ohio. Jan. 27th.

CLAIM.—What I claim therein as constituting my invention, and desire to secure by letters patent, is the manner in which I have constructed the clamp and its appendages, making a part of the carriage, and arranged the respective parts thereof, as described, so as to be operated upon by means of the rack L, the wedge pieces M M, and the trigger *m*, in the manner and for the purpose herein set forth. I do not claim the manner of constructing the clamp, the pinion, or ratchet wheel, or either of the parts taken alone, but only in their combination with each other, in the manner set forth.

Improvement in the manner of constructing the Face of the Curriers' Beam. By ICHABOD LINDSEY, Charlestown, Mass. Jan. 27th.

CLAIM.—What I claim as my improvement, and desire to secure by letters patent, is the method of constructing the curriers' beam, by inserting a slab of marble or other hard substance into the wood, by which means the utility of the instrument is greatly increased.

Improvements in the manner of discharging Fire-Arms of various kinds, whether of the smaller kind, as pistols, guns, &c. or pieces of ordnance. By JOSHUA SHAW, Philadelphia, Pa. Jan. 30th.

CLAIM.—What I claim as constituting my invention, and desire to secure by letters patent, is the effecting of the discharge of fire-arms by placing a percussion cap on the end of a cylindrical rod or piston formed for the purpose, in the manner herein set forth; such piston, with its cap, being made to pass through an opening adapted thereto, either in the body of the breech of the piece to be discharged, or through tubular pieces screwed into or otherwise attached to it; said piston being of such length as shall adapt it to the respective modifications of my

apparatus, as above described; that is to say, I claim the passing of such a piston through a tubular opening, allowing it to reach across the chamber, as in my first described modification; or I pass it into a cylindrical opening, extending nearly to the chamber, where a shoulder is formed by diminishing the size of the aperture, in the manner and for the purpose set forth; the respective parts concerned in the discharge being constructed and operating substantially as herein fully made known.

I claim, likewise, the improvement in the percussion cap, consisting of the perforation through the middle of what is usually its closed end, in the manner and for the purpose described.

Machine for Alarm of Fire. By JOSIAH BROWN, assignee of THEOPHILUS GOODWIN, Exeter, N. H. Jan. 30th. [Antedated July 30th, 1840.]

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the employment of the expansion of metals by heat to start an alarm of fire, in the manner and for the purpose herein described; using any other of the solid metals and applying them in any other shape to produce the same effect.

Improvement in the construction of the Inkstand, by the employment of a Capillary Wick, with an air-tight Stopper. By ISAAC M. MOTT, assignee of JOHN FARLEY, Washington, D. C. Jan. 30th.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the employment of a capillary action for the purpose of supplying the ink, as herein described, in combination with the air-tight stopper, arranged and operating as above set forth.

Improvement in the manner of constructing the Brick Press. By THOS. W. SMITH, Alexandria, D. C. Jan. 30th.

CLAIM.—What I claim therein as my invention, and desire to secure by letters patent, is the forming of the pressing mould by means of the frame D D, the sliding table C, and the standard and follower thereon, constructed and operating as herein set forth.

Improvement in the manner of constructing the Gridiron. By ISAAC DAMON, Northampton, Mass. Jan. 30th.

CLAIM.—What I claim as my own invention and improvement upon the common gridiron, and desire to secure by letters patent, is the employment of the crimped metallic plate instead of bars or open spaces, and also of the fender between the dripping pan and the fire, as herein and in the plans and drawings hereunto annexed are specified and described by me.

Improvement in the method of constructing the machine used for stretching or adjusting the size of Horse Collars, both in width and length. By JAMES P. OSBORN, Redington, N. J. Jan. 30th.

CLAIM.—What I claim as my invention, and wish to secure by letters patent, is the combination of the metal E, the movable form of wood F,

the manner of using the rope G, and the cranks C, and screw rods B, connected therewith, to form a horse collar, as before described.

Improvements in the machines for carding Cotton or Wool. By EBENEZER CRANE and ALANSON CRANE, Lowell, Mass. Jan. 30th.

CLAIM.—What we claim as our invention, and desire to secure by letters patent, is the attaching or fastening the top cards of the carding machine to revolving endless chains or belts, instead of securing them to the frame of the machine and making them stationary, as heretofore practiced, as herein described; and the application of such chains or belts, in combination with the rollers and adjusting screws and segments of a circle to the purpose of conveying the top cards of the carding machine to, and placing them in a position where they can be stripped by power, and the combination of the sweeps, and stripping and cleaning cards and crank for the purpose of stripping the top cards by power when placed in such position as herein described.

Improvement in the Endless Floor Horse Power for driving machinery. By JEREMIAH M. REED, Middlefield, N. Y. Jan. 30th. [Antedated Dec. 9, 1840.]

CLAIM.—What I claim as my invention, and which I desire to secure by letters patent, is the making the endless chain upon which the horse, &c. walks, by uniting together in the manner described a sufficient number of four-wheeled cars, as described, and also running the wheels in the space between the two endless rails on each side, in manner substantially as herein described.

Improvement in the Jacquard Machinery for Weaving all kinds of Figured Cloth. By ALEXANDER CALDERHEAD, Philadelphia, Pa. Feb. 3d.

CLAIM.—I claim as my invention the principle of lifting the speed or shire with metallic heddles, directly by the pattern apron and trunk, roll or receiver, or by lowering the heddles into the same, as described.

LIST OF ENGLISH PATENTS

GRANTED BETWEEN THE 28TH OF DEC. 1840, AND THE 28TH OF JANUARY, 1841.

John Buchanan, of Glasgow, coach-builder, for certain improvements in wheel carriages, whether for common roads or railways. Dec. 28; six months to specify.

William Bridges Adams, of Porchester-terrace, gentleman, for certain improvements in the construction of wheel carriages, and of certain appendages thereto Dec. 28; six months.

John Wells, of Vale-place, Hammersmith, gentleman, for certain improvements in the manufacture of coke. Dec. 30; six months.

William Henry Kempton, of the City-road, gentleman, for improvements in cylinders to be used for printing calicoes and other fabrics. Dec. 30; six months.

Henry Adcock, of Winstanley, civil engineer, for improvements in the means or apparatus for condensing, concentrating and evaporating aëriform and other fluids. Dec. 30; six months.

William Hensman, of Woburn, machinist, for improvements in ploughs. Dec 31; six months.

Joseph Parkes, of Birmingham, button manufacturer, for improvements in the manufacture of covered buttons. Dec. 31; six months.

William Newton, of Chancery-lane, civil engineer, for certain improvements in the rigging of ships and other navigable vessels. (A communication.) Dec. 31; six months.

Francis Burdett Whitaker, of Royton, Lancaster, cotton-spinner, for certain improvements in the machinery or apparatus for drawing cotton and other fibrous substances, which improvements are also applicable to warping and dressing yarns of the same. Dec. 31; six months.

Joseph Stubs, of Warrington, file manufacturer, for certain improvements in the construction of screw wrenches, and spanners for screwing and unscrewing nuts and bolts. (A communication.) Dec. 31; six months.

Thomas Robert Sewell, of Carrington, Nottingham, lace manufacturer, for certain improvements in obtaining carbonic acid from certain mineral substances. Dec. 31; six months.

William Henry Kempton, of Pentonville, gentleman, for improvements in lamps. Dec. 31; six months.

John Grylls, of Portsea, for improvements in the machinery used for raising and lowering weights. Dec. 31; six months.

Joseph Haley, of Manchester, Lancaster, engineer, for an improved lifting jack for raising or removing heavy bodies, which is also applicable to the packing or compressing of woods or other substances. Dec. 31; six months.

Louis Holbeck, of Hammersmith, gentleman, for improvements in obtaining or producing oil. (A communication.) Dec. 31; six months.

Henry Scott, of Brownlow-street, Bedford-row, surgeon, for improvements in the manufacture of ink or writing fluids. Dec. 31; six months.

Charles Golightly, of Gravel-lane, Southwark, gentleman, for a new apparatus for obtaining motive power. Jan. 4; six months.

George Child, of Lower Thames-street, merchant, for improvements in the manufacture of bricks and tiles, part of which improvements are applicable to compressing peat and other materials. (A communication.) Jan. 4; six months.

John Swindells, of Manchester, manufacturing chemist, for certain improvements in the manufacture of artificial stone, cement, stucco, and other similar compositions. Jan. 6; six months.

William Newton, of Chancery-lane, civil engineer, for certain improvements in looms for weaving. (A communication.) Jan. 6; six months.

John Rock Day, of Great Queen-street, Lincoln's Inn-fields, saddlers' ironmonger, for certain improvements in the construction of collars for horses and other draft animals. Jan. 6; six months.

Henry Gunter, of Cullum-street, Fenchurch-street, merchant, for improvements in preserving animal and vegetable substances. Jan. 6; six months.

Henry Bessemer, of Percival-street, Clerkenwell, for a new mode of checking the speed of, or stopping railroad carriages under certain circumstances. Jan. 6; six mos.

William Thompson, of Upper North-place, Gray's Inn-road, brush-maker, for improvements in the construction and mounting of various kinds of brushes and brooms. Jan. 8; six months.

William Lacy, of Birmingham, agent for certain combinations of vitrified and metallic substances, applicable to the manufacture of ornaments and the decoration and improvement of articles of domestic utility, and of household furniture, also applicable to church windows and ship lights. Jan. 11; six months.

Mathew Uzielli, of King William-street, merchant, for improvements in impregnating and preserving wood and timber for various useful purposes. (A communication.) Jan. 11.

William Newton, of Chancery-lane, civil engineer, for improved machinery for cleaning wheat and other grain or seeds from smut and other injurious matters. (A communication.) Jan. 11.

Thomas Harris, of Shiffnal, Salop, veterinary surgeon, for an improved horseshoe. Jan. 11; six months.

John Barwise, of St. Martin's-lane, chronometer maker, and Alexander Bain, of 35 Wigmore-street, Cavendish-square, machinist, for improvements in the application of moving power to clocks and timepieces. Jan. 11; six months.

Joseph Hall, of Cambridge, grocer and draper, for a seed and dust disperser, which is particularly applicable to the freeing of corn and other plants from insects. Jan. 14; six months.

Walter Hancock, of Stratford-le-bow, Essex, engineer, for certain improved means of preventing accidents on railways. Jan. 14; six months.

Pierre Armande le Comte de Fontainemoreau, of Skinner-place, Size-lane, for an improved machinery for carding and spinning wools and hairs, which he titles "Filo Finisher." (A communication.) Jan. 14; six months.

Melcher Garner Todd, of the island of St. Lucia, for a certain improved form of apparatus for the distillation and rectification of spirits. Jan. 14; six months.

John Loach, of Birmingham, brassfounder, for certain improvements in castors, applicable to cabinet furniture and other purposes. Jan. 14; six months.

William King Westley, of Leeds, flax machinist, for certain improvements in carding, combing, straightening, cleaning, and preparing for spinning hemp, flax, and other fibrous substances. Jan. 14; six months.

William Kenworthy, of Blackburn, Lancaster, spinner, and James Bullough of the same place, overlooker, for certain improvements in machinery or apparatus for weaving. Jan. 14; six months.

Charles Cameron, late captain in her majesty's 18th regiment of foot, and now residing at Mount Vernon, in Edinburgh, for certain improvements in engines to be actuated by steam or other elastic fluid. Jan. 14; six months.

Samuel Hall, of Basford, civil engineer, for improvements in the combustion of fuel and smoke. Jan. 14; six months.

Alexander Jones, of King-street, engineer, for improvements in the manufacture of copper tubes and vessels. Jan. 14; six months.

Edward Foard, of Queen's Head-lane, Islington, machinist, for an improved method or improved methods of supplying fuel to the fireplaces or grates of steam-engine boilers, brewers' coppers, and other furnaces, as well also to the fireplaces employed in domestic purposes, and generally to the supplying of fuel to furnaces or fireplaces in such a manner as to consume the smoke generally produced in such furnaces or fireplaces. Jan. 16; six months.

John Armes, of Plymouth, painter, for a new and improved method of making paint from materials not before used for that purpose. Jan. 16; four months.

James Smith, of Deanston Works, Perth, cotton-spinner, for certain improvements in the preparing, spinning, and weaving of cotton, silk, wool, and other fibrous substances, and in measuring and folding woven fabrics, and in the machines and instruments used for these purposes. Jan. 19; six months.

Thomas Robinson, of Wilmington-square, esquire, for improvements in drying woolen and other fabrics. Jan. 19; six months.

Thomas Vaux, of Frederic-street, Gray's Inn-road, worsted manufacturer, for improvements in horseshoes. Jan. 19; six months.

Caleb Bedells, of Leicester, manufacturer; Christopher Nichels, of York-road, Lambeth, gentleman; and Archibald Turner, foreman to the said Caleb Bedells, for improvements in the manufacture of braids and plats. (Partly a communication.) Jan. 19; six months.

John Barber, of Manchester, engraver, for certain improvements in machinery for the purpose of tracing or etching designs or patterns on cylindrical surfaces. Jan. 19; six months.

Frederic Steiner, of Hyndburn-cottage, Lancaster, turkey red dyer, for improvements in looms for weaving and cutting asunder double piled cloths, and a machine for winding weft to be used therein. (A communication.) Jan. 19; six months.

John Cox, of Gorgie-mills, Edinburgh, tanner, for improvements in apparatus for assisting or enabling persons to swim or float and progress in water. Jan. 19; six months.

Charles Berwick Curtis, of Acton, esquire, for a method or methods to be used on railways for the purpose of obviating collisions between successive trains. Jan. 19; six months.

Angier March Perkins, of Great Coram-street, Middlesex, engineer, for improvements in apparatus for heating by the circulation of hot water, and for the construction of pipes or tubes for such and other purposes. Jan. 21; six months.

John Melville, of Upper Harley-street, esquire, for improvements in propelling vessels. Jan. 21; six months.

William Hill Darker, sen. and Wm. Hill Darker, jun. both of Lambeth, Surrey, engineers, and William Wood, of Wilton, of Wilts, carpet manufacturer, for certain improvements in looms for weaving. Jan. 21; six months.

John Bradford Furnival, of Street Ashton, farmer, for improvements in the construction and application of air vessels. (A communication.) Jan. 21; six months

William Cooper, of Layham, Suffolk, ironfounder, for an improved method of constructing thrashing machines and other agricultural instruments. Jan. 21; two months.

Isham Baggs, of Cheltenham, gentleman, for improvements in printing. Jan. 23; six months.

Peter Fairbairn, of Leeds, engineer, and Wm. Serttill, of Newcastle-upon-Tyne, flax-spinner, for certain improvements in drawing flax, hemp, wool, silk and other fibrous substances. Jan. 26; six months.

Edward Henshall, Huddersfield, carpet manufacturer, for certain improvements in making, manufacturing, or producing carpets and hearth rugs. Jan. 26; four months.

Nathaniel Lloyd, of Manchester, and Henry Rowbotham, of the same place, calico printer, for certain improvements in thickening and preparing colors for printing calicoes and other substances. Jan. 26; six months.

Nathan Waddington Hulme, Lancaster, engineer, for certain improvements in the construction of steam-boilers and furnaces for heating the same. Jan. 26; six months.

Cornelius Alfred Jaquin, of Huggin-lane, for improvements in the manufacture of covered buttons, and in preparing of metal surfaces for such manufacture and other purposes. Jan. 26; six months.

John Bradford Furnival, of Street Ashton, Warwick, farmer, for improvements in evaporating fluids, applicable to the manufacture of salt, and to other purposes, where evaporation of fluids is required. (A communication.) Jan. 26; six months.

Richard Jenkyn, of Hoyle, Cornwall, machinist, for certain improvements in valves for hydraulic machines. Jan. 26; six months.

William Gall, of Beresford-terrace, Walworth, gentleman, for certain improvements in the construction of locomotive engines and of the carriages used on railways, applicable in part to carriages used on common roads. (A communication.) Jan. 28; six months.

William Currie Harrison, of Newland-street, Pimlico, engineer, for an improved turning table for railway purposes. Jan. 28; six months.

Joseph Pryor, of Wendron, Cornwall, builder, for an improved threshing machine. Jan. 28; six months.

LIST OF PATENTS GRANTED FOR SCOTLAND FROM THE 22D OF NOVEMBER TO THE 22D OF JANUARY, 1841.

John Buchanan, Glasgow, Scotland, coach-builder, for improvements in wheel carriages, whether for common roads or railways. Sealed; Nov. 25.

James Molyneux, of Preston, Lancaster, linendraper, for an improved mode of dressing flax and tow. Nov 26.

Samuel Wagstaff Smith, Leamington, ironfounder, for improvements in apparatus for supplying and consuming gas. Nov. 26.

Frederic Theodore Philippi, of Belfield Hall, near Rochdale, Lancaster, calico printer, for certain improvements in the art of printing cotton, wool, and other woven fabrics. Nov. 30.

Alexander Dean and Evan Evans, of Birmingham, Warwick, millwrights, for certain improvements in mills for reducing grain and other substances to a pulverized state, and in the apparatus for dressing or bolting pulverized substances. Dec. 8.

John Hawley, of Frith-street, Soho-square, Middlesex, watchmaker, for improvements in pianos and harps. (A communication.) Dec. 9.

Francis Molineux, of Walbrook Buildings, London, gentleman, for improvements in the manufacture of candles, and in the means of consuming tallow, and other substances for the purposes of light. Dec. 9.

Joseph Leese, jun. of Manchester, Lancaster, calico printer, for improvements in the art of printing calicoes and other surfaces. Dec. 11.

Philippe Marie Moindron, of New Ormond-street, Middlesex, merchant, for improvements in the construction of furnaces, and in boilers. (A communication.) Dec. 17.

John Cartwright, of Loughborough, Leicester, manufacturer of hosiery; Henry Warner, of the same place, manufacturer of hosiery; and Joseph Haywood, of the same place, framesmith; for certain improvements upon machinery, commonly called stocking frames, or framework knitting machinery. Dec. 22.

Robert Cooper, of Pebworth, Gloucester, gentleman, for improvements in ploughs. Dec. 24

Henry Trewhitt, of Newcastle-upon-Tyne, Northumberland, esquire, for certain improvements in the fabrication of china and earthen ware, and in the apparatus or machinery applicable thereto. (A communication.) Dec. 24.

Charles Parker, of Darlington, Durham, flax-spinner, for improvements in looms for weaving linen and other fabrics to be worked by hand, steam, water or any other motive power. Dec. 24.

John Werthiemer, of West-street, Finsbury Circus, London, printer, for certain improvements in preserving animal and vegetable substances and liquids. (A communication.) Dec. 24.

Edmund Leach, of Rochdale, Lancaster, machine maker, for certain improvements in machinery or apparatus for carding, doubling and preparing wool, cotton, silk, flax, and other fibrous substances. Dec. 28.

William Hicklin Burnett, of Wharton-street, Bagnigge Wells Road, Middlesex, gentleman, for improved machinery for cutting or working wood. Dec. 28.

John Grylls, of Portsea, for improvements in the machinery used for raising and lowering weights. Dec. 31.

Samuel Brown, of Hoxton, Middlesex, civil engineer, for improvements in making casks and other vessels of or from iron. Dec. 31.

William Henry Bailey Webster, of Ipswich, Suffolk, surgeon in the royal navy, for improvements in preparing skins and other animal matters for the purposes of tanning and the manufacture of gelatin. Dec. 31.

Colin Macrae, of Cornhill, Perthshire, Scotland, for improvements in rotary engines worked by steam, smoke, gases, or heated air, and in the modes of applying such engines to useful purposes. (A communication.) Dec. 31.

Moses Poole, of Lincoln's Inn, Middlesex, gentleman, for improvements in drying woolen and other fabrics. Dec. 31.

Thomas Clark, of Wolverhampton, Stafford, ironfounder, for certain improvements in the construction of locks, latches, and such like fastenings, applicable for securing doors, gates, windows, shutters, and such like purposes. (A communication.) Jan. 6, 1841.

Hugh Unsworth, of Blackrod, near Bolton, Lancaster, bleacher, for certain improvements in machinery or apparatus for mangling, drying, damping, and finishing woven goods or fabrics. Jan. 7.

Henry George Francis, Earl of Ducie, of Woodchester Park, Gloucester, Richard Clyburn, of Aley, engineer, and Edwin Buddin, engineer, of Dursley, in the same county, for certain improvements in machinery for cutting vegetable and other substances. Jan. 8.

Thomas Spencer, of Liverpool, Lancaster, carver and gilder, and John Wilson, of Liverpool, aforesaid, lecturer on chemistry, for certain improvements in the process or processes of manufacturing metallic cylinders and for engraving thereon, and for engraving in metals generally. Jan. 9.

John Mason, of Rochdale, Lancaster, machinist, and Alexander Stiven, of Manchester, in the same county, engineer, for certain improvements in machinery or apparatus to be used for turning and boring purposes. Jan. 13.

William Hill Darker, sen. and Wm. Hill Darker, jun. both of Lambeth, Surrey, engineers, and William Wood, of Wilton, of Wilts, carpet manufacturer, for certain improvements in looms for weaving. Jan. 18.

John Aitchison, of Glasgow, in Scotland, and Archibald Hastie, of West-street, Finsbury-square, Middlesex, for certain improvements in generating and condensing steam, heating, cooling and evaporating fluids. Jan. 20.

Joseph Haley, of Manchester, Lancaster, engineer, for an improved lifting jack for raising or removing heavy bodies, which is also applicable to the packing or compressing of goods and other substances. Jan. 21.

LIST OF IRISH PATENTS GRANTED FOR DECEMBER, 1840.

George Gwynne, for improvements in the manufacture of candles, and operating upon oils and fats.

G. A. Gilbert, for certain improvements in machinery or apparatus for obtaining and applying motive power.

A. E. Walker, for improvements in engraving by machinery.

M. Berry, for certain improvements in machinery or apparatus for making or manufacturing pins, and sticking them in paper.

A. Wall, for a new composition for the prevention of corrosion in metals, and for other purposes.